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**Anaktuvuk Pass Subsistence Fishery Harvest Assessment:  
October 2001 through September 2003**



**Final Report for FIS Study 02-050**

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## ABSTRACT

A two-year subsistence fishery harvest assessment in Anaktuvuk Pass, Alaska, a small arctic Inupiat community, not accessible by the road system, was undertaken in response to local and government concerns regarding lack of current resource management information available to manage a small but economically and culturally important fishery. Few records of annual community fish catches for Anaktuvuk Pass exist, but those available show that community fishers produce annual catches of “char” (a mix of Arctic char [*Salvelinus alpinus*] and Dolly Varden [*Salvelinus malma*]), lake trout (*Salvelinus namaycush*), Arctic grayling (*Thymallus arcticus*), Arctic cisco (*Coregonus autumnalis*), and to a lesser degree burbot (*Lota lota*).

A community-based household interview study from October 2001 through September 2003 produced seasonal (“Winter” and “Summer”) and annual community, household and per capita harvest estimates for all reported fish species, as well as information on community fishing effort and sharing of harvested fish between households. Information on catches of Dolly Varden was of special interest to agencies, and whenever possible those catches are identified in this report. Distinguishing species composition in self-reported catches of “char” was difficult, but resolved by categorizing catches from river-fishing sites as Dolly Varden and those coming from lake-fishing sites as Arctic char.

In Study Year 1 (October 2001-September 2002) the estimated community fish harvest was 5,372 lbs, comprised of Arctic grayling (45%), char (Arctic char and Dolly Varden) (28%), lake trout (26%), and small catches of burbot and Arctic cisco amounting to less than 1% in aggregate. The estimated community per capita harvest was 16.1 lbs, and mean household harvest was 57.6 lbs. A total of 21 harvest locations were reported for the harvest period.

The estimated community fish harvest in Study Year 2 (October 2002-September 2003) was 4,284 lbs, comprising char (Arctic char and Dolly Varden) (44%), Arctic grayling (27%), lake trout (27%), and catches of burbot, Arctic cisco and unclassified fish (1%). Per capita harvest for the 12-month period was estimated at 12.6 lbs, and the estimated mean household harvest was 44.2 lbs. Twenty-one harvest locations were reported for the study period.

“Winter” was the most productive season for char harvests in both study years with estimated community harvests of 1,173 lbs in Study Year 1 and 1,912 lbs in Study Year 2. Based on updated catch location information, these catches were mainly Arctic char, not Dolly Varden. In Study Year 1 the estimated “Winter” catch of Dolly Varden was 202 lbs (17% of char catch), and in Study Year 2 the “Winter” catch was estimated at 76 lbs (4% of char catch).

The estimated “Summer” char harvest was 320 lbs in Study Year 1 and 57 lbs in Study Year 2. Dolly Varden constituted an estimated of 232 lbs (73% of char catch) in Study

Year 1 and 8 lbs (14% of char catch) in Study Year 2 based on catch location information.

The estimated annual harvest of Dolly Varden was 434 lbs, or 8 percent of total estimated catch in Study Year 1, and derived from 5 distinct river fishing sites. In Study Year 2 an estimated 98 lbs of Dolly Varden, 2 percent of the estimated total annual fish catch, were derived from 4 distinct river fishing sites.

Of 26 fishing sites reported in the study period, all but 1 was located within a 30-mile radius of the community. Commonly used sites were located immediately to the north of the community, in the upper Anaktuvuk River drainage, and to the south, in the upper John River drainage. However, 1 favorite winter site, Chandler Lake, lay 30 miles west. The most distant fishing site recorded as accessed in the study period, Itkillik Lake, some 60 miles to the east-northeast, is a favorite place to catch large lake trout in late winter. The site was visited during the “Winter” season in both study years.

Reported Dolly Varden harvests in both “Winter” seasons were mainly produced by hook-and-line jigging through holes drilled in river ice, or by fishing at the ice-edge in places where portions of the river stay open all winter.

“Summer” harvests of Dolly Varden were produced by rod-and-reel fishing in both study years.

Fishing sites producing Dolly Varden harvests in the study period were confined to a handful of sites in the upper John River and Anaktuvuk River drainages. “Winter” catches came from one site in the upper John River drainage in Study Year 1 and two sites (one in the upper John River drainage and one in the upper Anaktuvuk River drainage) in Study Year 2. “Summer” catches of Dolly Varden were produced at four sites (three in the upper John River drainage and two in the upper Anaktuvuk River drainage) in Study Year 1 and from two sites located in the upper Anaktuvuk River drainage in Study Year 2.

Estimated community household “Winter” harvest participation ranged from 1 to 26 in fishing months. In Study Year 1, no fishing was reported in two months (January and February), and in Study Year 2 there was no “Winter” fishing reported in three months (November through January). In both “Winters” the month of April had the highest household fishing rate with an estimated 19 households ice-fishing at Chandler Lake (Fishing Site #15) in both years.

The estimated community household participation in the “Summer” fishing varied from a low of 4 households for September in both study years to a high of 29 and 19 households, respectively, in July of Study Year 1 and 2. In both “Summer” studies households reported visiting a total of 12 fishing sites. Estimated household participation rates at the sites were relatively even, though in Study Year 1, Cache Lake (Fishing Site #7) and Glacier (Fishing Site #5) had the highest rates (9 and 7 households, respectively), and in



Study Year 2 Glacier (Fishing Site #5) and Upper John River (Fishing Site #1) had the highest rates (7 and 4, respectively).

Use and sharing of locally harvested fish was common among community households in the study period. For instance, with an estimated 39 percent of households harvesting fish in “Winter” 2001-2002, an estimated 65 percent of community households used fish from that harvest, and in “Summer” 2002 an estimated 56 percent of community households harvested fish and 78 percent of households were estimated to use locally harvested fish in the period. The “Winter” 2002-2003 sharing figures were similar to those of 2001-2002, but the “Summer” figures were different. In the “Summer” of 2003 (Study Year 2), an estimated 28 percent of households fished, and 43 percent of community households used locally harvested fish in the period. We believe the lower estimated “Summer” fish production and sharing rates were the result of particularly high rates of household participation in summer employment that season.

Estimated annual community fish harvests in the study period were comparatively close to previous estimates and confirm that fish, and in particular Arctic grayling, “char” (especially Arctic char), and Lake trout, continue to play a significant role in the annual subsistence economy in Anaktuvuk Pass. Though the present role of Dolly Varden was found to be a smaller component of the fishery than expected, this study firmly documents that fishing as a traditional seasonal activity remains intact in the Nunamiut community of Anaktuvuk Pass, Alaska.

Local participation in and contribution to this study demonstrates that local capacity exists to effectively participate in resource monitoring and documentation of local knowledge, both of which are key areas in shaping effective resource management and planning.

Vulnerability of the community fishery to disturbance, global warming, and more conservative regulation due to limited information on the stocks being harvested are expressed local concerns. In addition, limited availability of temporal, quantitative, and spatial subsistence harvest information, as well as unresolved systematic questions regarding the economically important “char” (Arctic char and Dolly Varden) fishery, need to be addressed. This is particularly urgent as more robust resource and resource-use information is needed to guide planned energy resource exploration, and possibly development and production, within the community’s subsistence use area.

In light of the above, we recommend that efforts be made to implement a longitudinal community subsistence fishery harvest assessment project, to place ethnographic (descriptive) information on the fishery in a current context, and to significantly improve area fish stock identification and management information. Ideally, recommended projects would build on local project participation capacity developed in the course of this study and, by design, allow for increased local participation in local fish studies, stock management, and planning efforts.

**Key Words:** Anaktuvuk Pass, Nunamiut, Gates of the Arctic National Park and Preserve, harvest monitoring, harvest assessment, subsistence fishery, local knowledge, capacity building, Arctic grayling (*Thymallus arcticus*), sulupaugaq, Dolly Varden, (*Salvelinus malma*), iqaluqpik, Arctic char (*Salvelinus alpinus*), iqaluqpik, lake trout (*Salvelinus namaycush*), iqaluaqpak, Arctic cisco (*Coregonus autumnalis*), qaaktaq, burbot (*Lota lota*), tittaliq, and DNA sampling.

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## INTRODUCTION

This project was initiated in response to local issues and information needs identified by Arctic/Kotzebue/Norton Sound Regional Subsistence Advisory Councils during February 2000 (U.S. Fish and Wildlife Service 2000: 4-5; Stock Status and Trends, and Subsistence Harvest Monitoring). In addition, the need for this study was raised by the Anaktuvuk Pass representative to the North Slope Borough Fish and Game Management Committee at its December 2000 meeting in Barrow, Alaska. The committee endorsed the project as did staff from the Gates of the Arctic National Park and Preserve. Support for this project focused on the need for information useful in resource management and planning on park and nearby state lands.

The Nunamiut (inland) Inupiat (Eskimos) of Anaktuvuk Pass rely on a smaller range of subsistence resources than do their relatives in other North Slope Borough (NSB) communities. As is the case in other NSB communities, however, a variety of fish species serves as an important subsistence resource to Anaktuvuk Pass residents. Several accounts document the long-time importance of fish both as human and dog food (Campbell 1962; Gubser 1965; Ingstad 1954; Hall 1986). Additionally, archaeological and oral historical accounts indicate that prior to settling in Anaktuvuk Pass in the early 1950s, Nunamiut seasonal settlements were typically situated near productive caribou hunting and fishing grounds (Campbell 1962; Gubser 1965).

Documentation of fish harvests (both numbers and species composition) and fish-harvest locations by Anaktuvuk Pass residents is limited. While estimates of community harvests are scarce and incomplete, several studies provide some insight into the importance of fish to the Nunamiut diet. Patterson (1974) estimated that in 1973, total annual fish harvest averaged approximately 4,000 pounds, or about 3 percent of the diet. Twenty years later, Brower and Opie (1996) estimated that Anaktuvuk Pass residents harvested approximately 1,300 fish annually. This harvest was estimated to comprise about 4 percent of the total diet. Estimates as to the percentage of fish in their traditional diet range from a low of perhaps 10 percent or less, under normal circumstances when caribou and other resources were readily available, to a high of between 15 and 20 percent in times when caribou and the other fallback resources were in short supply (Gubser 1965: 252).

In addition to limited harvest data, some data on fishing locations also have been collected. Pedersen (1979) documented general community fishing areas for Anaktuvuk Pass, and Nelson (1982) collected limited information of species fishing locations. Some Nunamiut natural history information on the species of fish harvested is available in Campbell (1962) and Gubser (1965), but there is a paucity of comprehensive historical information from community residents.

Based on these varied and incomplete accounts, it appears that char (Arctic char and Dolly Varden), lake trout and Arctic grayling are the fish species of primary importance, although burbot and several species of whitefish are also harvested by Anaktuvuk Pass residents (Brower and Opie 1996; Campbell 1962; Gubser 1965; Hall 1985; Ingstad 1954). Of all

fish species harvested, sources indicated that Dolly Varden were thought to be one of the most important both in terms of numbers harvested and local preference as in many other North Slope Borough communities (Craig 1987; Fall & Utermohl 1995; Pedersen 2000; Scott et al. 2000). Also, the majority of Dolly Varden taken in the Anaktuvuk Pass fishery were thought to be anadromous, and harvested in mixed stock fisheries within and outside of federal conservation units (U.S. Fish and Wildlife Service 2000).

Residents of Anaktuvuk Pass have at various times formally expressed concern about protecting overwintering areas and maintaining sustainable char (Arctic char and Dolly Varden) populations. For instance, at the December 2000 NSB Fish and Game Management Committee meeting in Barrow, a representative from Anaktuvuk Pass noted that the community was concerned over potential negative effects of possible nearby industrial development on availability and access to fish and other community subsistence resources. Community leaders also noted that while limited information on caribou and sheep harvests exist, no comprehensive ethnographic or current detailed information on the subsistence fishery in Anaktuvuk Pass was available. Because of the importance of these stocks for local subsistence users, and due to the fact that there is no current comprehensive harvest assessment information for fish species, this fish-harvest assessment, natural history, stock status, and ethnographic study were undertaken.

## **OBJECTIVES**

The following six objectives provided the framework for this study:

1. Estimate the total annual subsistence harvest by Anaktuvuk Pass residents of all fish species, including Dolly Varden, through two annual community household surveys (Oct. 2001-Sept. 2002 and Oct. 2002-Sept. 2003).
2. Compile information on fishing locations, productivity, effort, gear types, and participation rates based on survey information.
3. Collect descriptive Nunamiut natural history information on key fish species utilized by Anaktuvuk Pass residents.
4. Develop a basic cultural history description (ethnography) of the local subsistence fishery.
5. Sample local subsistence Dolly Varden harvests for genetic analysis to estimate stock composition of harvests and investigate seasonal movement patterns and stock origins of subsistence harvested Dolly Varden.
6. Develop local capacity in Anaktuvuk Pass to participate in defining research questions, collecting, reviewing and analyzing data, and reporting the study findings.

## METHODS

### *A. Harvest Assessment*

Community subsistence fish-harvest data for Study Years 1 and 2 (October 2001 through September 2002, and October 2002 through September 2003) were collected through four separate systematic seasonal household surveys ("Winter" 2001-2002, "Summer" 2002, "Winter" 2002-2003, and "Summer" 2003) in which all households in the community, at the time of the survey, were contacted. Thus a census, rather than sampling, approach was used in this study. Household survey information was based on retrospective recall for a period of up to eight months.

Two annual survey periods were used in each study-year based on recommendations from community representatives that we would obtain better information if we contacted fishers after the end of each local fishery "season." The "Winter" season was locally defined as generally beginning in October and lasting through May, a period when snowmachines are the principal mode of transportation in all major subsistence activities, including fishing. The "Summer" season was then basically the snow-free season (June through September) when wheeled types of transportation predominated in accessing fishing sites.

See Appendix 1 for a sample survey instrument used in this study. Local fish species terms (Table 1) and names of fishing sites (Table 3) were used when recording what species of fish had been harvested by community households in a particular season.

In analyzing results of reported harvest information for trout species other than Lake trout, we found that the local naming convention for these fish ("char", "Dolly Varden", "Arctic char", "iqaluqpiq" and "Old Man fish") led to a lack of clarity in discussing harvests of Dolly Varden. In order to resolve this, we applied recent systematic and life-history information for Arctic char and Dolly Varden as a guide (Mecklenburg et al. 2002; Morrow 1980). On that basis we classified harvests of Arctic char, Dolly Varden or "Old Man" fish from river- and creek-fishing sites in the study area as Dolly Varden and those originating from lake-fishing sites as Arctic char.

This study was conducted in accordance with the Division of Subsistence policy on research ethics. A local research assistant, Ms. Cheryl Hugo, was hired by the City of Anaktuvuk Pass and trained by Division staff, to administer each survey. Households were contacted and provided information about the voluntary and confidential nature of their participation. In addition, households were given contact information for people involved in the study in the event that they wanted additional project information.

### **a. Survey Approach**

Based on a July 2002 updated community household listing available from the City of Anaktuvuk Pass, an initial household survey list was drawn up. This list was reviewed and updated as needed by the local research assistant prior to each household survey effort.

At the time this study began there were less than 100 households in Anaktuvuk Pass. Given the small community size, a census approach to obtaining the desired information was deemed appropriate. Thus, all community households present at the time of the survey effort were invited to participate.

### **b. Pre-Fieldwork Training Sessions**

A pre-fieldwork training session with the local research assistant, Ms. Cheryl Hugo, was conducted in July 2002 in preparation for the “Winter” 2001/2002 survey. Although that training session, and the associated community survey, took place later than planned, subsequent training was conducted as planned. The first training session accomplished the following:

1. Provided the local research assistant with information on previous fishery research in the community.
2. Reviewed and discussed goals and procedures for this study.
3. Helped the local research assistant understand basic survey administration and record keeping.
4. Afforded realistic practice in contacting households and conducting successful household interviews.

Subsequent training sessions built on the first and extended training into practical experience in recording general observations of community fishing activity during each survey period.

Ms. Hugo was supplied with a training and support packet which included a training manual to guide her in survey administration and other project record keeping, a fish identification guide, and specific information regarding the survey (such as confidentiality of survey responses) to ensure the provision of informed consent for each participating household.

### **c. Data Collection Phase**

Harvest and use data for the period October 2001 through June 2002 (referred to as “Winter “ 2001-2002) were collected in August and September 2002 in face-to-face interviews between the local research assistant and a knowledgeable household representative. Using the same approach “Summer” 2002 (July through September 2002) data were collected during October 2002, “Winter” 2002-2003 data were obtained in June and July 2003, and “Summer “ 2003 harvest survey data were conducted in late September and through October 2003. Division of Subsistence staff in Fairbanks and City of Anaktuvuk Pass staff carefully monitored the local research assistant to ensure her safety and to answer questions or provide additional information and clarification on survey implementation.

Subsistence harvest data collected on the North Slope and based on face-to-face household surveys have consistently resulted in harvest estimates that characterize community harvest levels better than those derived from more formal instruments (i.e., harvest tickets). Furthermore, experience has shown us and others (e.g., Trotter and Schensul 1998) that harvest surveys administered by local research assistants, with whom community residents generally are more comfortable, result in higher levels of household participation and better information in community-based research.

### ***B. Natural History Information and Ethnography***

Associated with obtaining quantitative measures of subsistence fish harvests in Anaktuvuk Pass, this project included a modest effort to obtain highly focused local natural history information about Dolly Varden and Arctic char in the Brooks Range. A one-page interview guide was developed with assistance from Mr. Grant Spearman, of the Simon Paneak Memorial Museum in Anaktuvuk Pass, and Ms. Cheryl Hugo received hands-on training in this information-collection method from both the PI and Mr. Spearman.

Primary data collection, through guided conversations with key informants in Anaktuvuk Pass, was undertaken in late winter 2002/2003 and again in July and August 2003. Individuals that were considered particularly knowledgeable about fish species in the central Brook Range were identified with the assistance of city and Tribal personnel in Anaktuvuk Pass.

These interviews were all semi-structured in format, meaning that the interviewer only outlines general areas of inquiry and considerable flexibility is provided the respondent in providing answers. Interviews were carried out in a quiet office area provided by the City of Anaktuvuk Pass, tape-recorded with the use of a small noninvasive cassette recorder, and supplemented with interview notes. During interviews, maps and, in some cases, pictures were used as prompts. Relevant information (e.g., locations of spawning areas,

rearing habitat, traditional harvesting areas, etc.) was mapped on a clear plastic overlay over USGS 1:250,000 maps. Interview tapes were dated and marked with the key informant's name. Individual interviews were transcribed, and the respondent was given a copy to review and provide additional information or comments. Each interview map-overlay was carefully marked with respondent's name, date of interview, interviewer's name, and a key to markings made on the overlay.

Recorded interviews include the following types of information (as reported by local experts): species utilized and local names for fish species; natural history information including habitat preferences, spawning and rearing areas, and seasonal movements of fish; traditional as well as contemporary harvest methods, including timing of harvest, gear used, mapping of harvest areas, and collection of fish- and fishing-related place names; and relative abundance and population trends.

Information obtained through interviews paralleled and were integrated into the ethnographic summary of the subsistence fishery in Anaktuvuk Pass, administered as a separate USFWS-FIS contract with the Simon Paneak Memorial Museum in Anaktuvuk Pass (a unit of the North Slope Borough's Planning Department). This component of the project design was to produce an ethnography of Nunamiut (as Inupiat residents of Anaktuvuk Pass refer to themselves) fishing that would, in combination with information on current activities, increase the temporal perspective beyond what was captured in the subsistence fishery harvest assessment.

Methods used to obtain ethnographic information include literature review, and include general as well as focused interviews with particularly experienced and knowledgeable local fishers and elders (former fishers). Key informant interviews were tape-recorded (with permission of the interviewee) and information transcribed following standard informed consent procedures. Biological sketches of key species taken by the Nunamiut, as well as the importance of fish in the Nunamiut diet over time, and changing fishing methods and technology are discussed in this report component (Spearman 2005).

Ms. Hugo, the project's local research assistant, supported museum staff in a number of key informant interview sessions pertaining to resource use information for some northern Brooks Range drainages. She also assisted in transcribing taped interviews and obtained additional local information on the Inupiat spelling of place names mentioned in interviews.

### ***C. Biological Sampling***

Fin-clipping (taking a small portion of the dorsal fin) of a sample of "Winter" and "Summer" subsistence harvested Dolly Varden for genetic stock (DNA) assessment was an important part of this project. Local research assistant, Ms. Cheryl Hugo, received general and practical training in field identification of Dolly Varden, the art of taking a fin-clip



sample, sample care, and record-keeping from project staff. The approach and procedures for this work were documented in a field manual kept by Ms. Hugo. Sample vials, fish measuring and sampling equipment, and record-keeping forms for the 2001-2002 and 2002-2003 study years were provided.

Throughout the project, community fishers were notified (by CB radio and through notices placed at the post office, in the store, and in the City Office) that Ms. Hugo was seeking samples of Dolly Varden. To encourage participation in this effort, the City offered to pay fishers \$10 per sample. A maximum number of 100 samples from a variety of harvest locations in the Anaktuvuk Pass area was set for each of the 2 funded study years.

Each fin-clip sample obtained from a locally harvested Dolly Varden was placed in a sequentially numbered vial and recorded on a sample sheet along with the date and location of harvest. The fork length of the fish (in mm) was recorded, also. Each sample vial was placed in a specially designed plastic box capable of holding up to fifty samples.

As sampling progressed, record sheets and sample vials were submitted periodically to the PI. After review by the PI, sample boxes and associated documentation were turned over to Fairbanks ADF&G Sport Fish biologist, Mr. Tim Viavant, who subsequently submitted them for analysis by the USFWS Fisheries Genetics Laboratory.

#### ***D. Capacity Building***

A significant component of the capacity-building aspect of this project was to train and help develop a local resident to effectively participate in this study. The selected community research assistant received comprehensive training from the PI. Training sessions were focused and included instructions on how to carry out planned household fishery harvest surveys, as well as collect and organize key respondent natural history (ethnographic) information on the local subsistence fishery. Practical experience in taking and recording DNA (biological) samples and physical measurements of locally harvested Dolly Varden completed the training components of this project.

## RESULTS

### *A. Harvest Assessment*

Four “seasonal” subsistence fishery harvest assessments (“Winter” 2001-2002, “Summer” 2002, “Winter” 2002-2003, and “Summer” 2003), representing two 12-month study years (October through September), were completed in Anaktuvuk Pass. All household surveys from each “season” were carefully reviewed before proceeding to data entry and standard division data processing.

Survey participation was very good in the two Study Years. For the “Winter” 2001-2002 survey, 82 of 97 community households (or 85%) were interviewed; for the “Summer” 2002 survey, 77 of 89 community households (or 88%) were interviewed; for the “Winter” 2002-2003 survey, 83 of 97 community households (or 86%) were interviewed; and for the “Summer” 2003 survey, 95 of 97 community households (or 98%) were interviewed.

In each seasonal survey effort, there were always households either out of town, not available for a variety of other reasons (working, never home, etc.), or refusing to participate while surveys were taken. For instance, at the time “Summer” 2002 surveys were taken, there were 99 households in the community. However, ten households (nine school teachers and a Public Safety officer) had been in Anaktuvuk Pass for one month or less, and had not participated in fishing in the community area during that time. Rather than inflating the estimated total community harvest for the summer by including these households, the “Summer” estimate was based on 89 households resident for the entire survey period. Similar adjustments were made to the other three surveys as well.

Harvests of “char” (iqaluqpik) during the two study years were reported in household surveys as Arctic char, Dolly Varden or “Old Man” fish. As mentioned in the methodology section, based on the most recent life-history information for Dolly Varden and Arctic char in Alaska, we classify reported harvests of the three fish from rivers and creeks in the study area as Dolly Varden and those harvests reported from lakes as being Arctic char. However, in this section we present results from household surveys as reported to us, and in the “Discussion” section we clarify the information we have on community Dolly Varden harvests for the study period.

#### **a. Study Year 1 (October 2001-September 2002)**

During “Winter” 2001-2002, the estimated edible weight of the landed community subsistence fish harvest was 3,168 lbs, and the “Summer” 2002 harvest yielded an estimated 2,189 lbs (Tables 7 and 8). Estimated community useable harvests by “season” were derived by statistical extrapolation from the known, random, household sample to all

community households. Estimated edible weight, not live-fish weight, was used to derive harvest estimates by species. North Slope resource studies established edible weight conversion factors used in this work (Scott et al. 1992: Table 1).

Twelve distinct (and named) community fishing locations were reported for the “Winter” 2001-2002 subsistence fishery, and 18 were reported for the “Summer” 2002 fishery (Table 1; Figures 4 and 5). In all, successful fishing was reported at 21 distinct fishing sites in Study Year 1 (Table 3; Figure 6).

The estimated “Winter” 2001-2002 subsistence fish harvest was comprised of four species: Arctic char (1,173 lbs), lake trout (1,041 lbs), Arctic grayling (907 lbs), and burbot (47 lbs) (Table 7).

Four species were reported in the “Summer” 2002 subsistence fishery, with Arctic grayling providing the greatest estimated edible harvest contribution (1,493 lbs) and lake trout, Arctic char, and whitefish providing a smaller, but significant, estimated catch (328, 320, and 48 lbs, respectively) (Table 8).

Combining results of the two surveys provides an annual (October 2001 through September 2002) Study Year 1 estimated community edible fish harvest of 5,372 lbs, or 16.1 lbs of fish per capita in Anaktuvuk Pass. Arctic grayling was the most commonly harvested fish species, comprising 45 percent of the estimated harvest (7.2 lbs per capita). Arctic char and lake trout comprised 28 and 26 percent of the estimated harvest and contributed 4.5 and 4.1 lbs per capita, respectively. Estimated catches of burbot and whitefish in Study Year 1 were relatively low (47 and 52 lbs, or 0.1 and 0.1 lbs per capita, respectively) (Table 9).

In Study Year 1, fish were harvested in all but two months (January and February). Arctic grayling harvests were reported in nine of ten months fished, lake trout harvests in eight of ten months fished, Dolly Varden harvests in seven of ten months fished, Arctic cisco harvests in four of ten months fished, and burbot in three of ten months fished (Tables 5, 13, 15, and 19).

Ten Dolly Varden harvest sites were reported in Study Year 1, with three being “Winter” sites, six being “Summer” sites, and one being used in both seasons (Table 5). The most productive site, by far, was Chandler Lake (Fishing Site #15; Table 3), where an estimated total of 351 Dolly Varden were harvested (66 percent of annual harvest estimate) by up to 15 households over a six-month period spanning both the “Winter” and Summer” seasons (November, December, March, April, May, and June) (Tables 5, 13, 15, and 19). Five fishing sites each were located on a river/stream or lake, and as mentioned previously, fishing sites for Dolly Varden located at lakes were considered as producing Arctic char. This matter is more fully expanded upon in the “Discussion” section of this report.

All “Winter” and “Summer” fish-harvest sites recorded as accessed in Study Year 1 were located well inside the previously defined community-based subsistence fishing area (Figure 11).

Reported fishing method reported for Dolly Varden in Study Year 1 was “hook-and-line” in both seasons, with jigging a lure under the ice (using a hand-line or small rod) in “Winter” and rod-and-reel fishing the preferred “Summer” method.

Household fishing site access in Study Year 1 in “Winter” was mainly by snowmachine (but included a few instances of ATV access), and access in “Summer” was mainly by ATV (but included a few instances of access via pickup truck and on foot).

Household fishing effort ranged from a low of 1 household in November and December to a high of 17 in April, 12 in March, and 10 in May (Table 13). Household “Winter” fishing effort was the highest at Chandler Lake (Fishing Site #15; Table 3; Figure 4), with an estimated 15 households harvesting fish there in April, 8 each in March and May, and 1 each in November and December (Table 13).

“Summer” household fishing effort for Dolly Varden was estimated at five households in June and six in July. The greatest household fishing effort was focused on the month of July when, according to our estimates, 6 households harvested 80 Dolly Varden at 5 fishing sites. The Upper John River Fishing Site (Fishing Site #1; Table 3) and Ekopuk Creek (Fishing Site #9; Table 3; Figure 5) were the most productive sites with an estimated 35 and 36 fish harvested, respectively. In June an estimated 5 households harvested 35 Dolly Varden at 3 sites, with Chandler Lake and Clear Lake (Fishing Sites #1 and #22) providing the bulk of the estimated harvest (13 and 17 fish, respectively) (Figures 4 and 5; Tables 3, 5, 13, 15, and 19).

Sharing of fish harvested among households in Study Year 1 is estimated in Tables 7 and 8. An estimated 39 percent of households fished during the “Winter,” and an estimated 65 percent of households used fish in that season. During “Summer,” an estimated 56 percent of community households harvested fish, and 80 percent of households were estimated to use fish in that season.

## **b. Study Year 2 (October 2002-September 2003)**

The “Winter” 2002-2003 estimated edible weight of the landed community subsistence fish harvest was 3,216 lbs, and the “Summer” 2002 harvest yielded an estimated 1,068 lbs (Tables 10 and 11). Estimated community useable harvest by “season” was derived by statistical extrapolation from the known, random, household sample to all community households. Estimated edible weight, not live-fish weight, was used to derive harvest estimates by species. North Slope resource studies established edible weight-conversion factors used in this work (Scott et al. 1992: Table 1).

Ten distinct (and named) community fishing locations were reported for the “Winter” 2002-2003 subsistence fishery, and 15 were reported for the “Summer” 2003 fishery (Table 1; Figures 7 and 8). In all, successful fishing was reported at 21 distinct fishing sites in Study Year 2 (Table 3; Figure 9).

Fish harvests in Anaktuvuk Pass reported during Study Year 2 were comprised of five species (burbot, Arctic char, lake trout, Arctic grayling, and, based on local description, Arctic cisco). The “Winter” 2002-2003 estimated harvest comprised five known species: Arctic char (1,829 lbs), lake trout (1,141 lbs), Arctic grayling (172 lbs), Dolly Varden (26 lbs), and burbot (9 lbs) (Table 10). Five species were reported in the “Summer” 2003 subsistence fishery, with Arctic grayling providing the greatest estimated edible harvest contribution (987 lbs) followed by Arctic char (57 lbs), burbot (12 lbs), Arctic cisco (8 lbs), and lake trout (4 lbs) (Table 11).

Combining results of the two seasonal surveys provides an annual Study Year 2 (October 2002 through September 2003) estimated community edible fish harvest of 4,284 lbs, or 12.6 lbs of fish per capita in Anaktuvuk Pass. Arctic char comprised 44 percent of the estimated annual harvest (1,886 lbs or 5.6 lbs per capita), followed by Arctic grayling at 27 percent (1,159 lbs or 3.4 lbs per capita), lake trout 27 at percent (1,145 lbs or 3.4 per capita), and unknown fish (“Old Man” fish, 38 lbs), Dolly Varden (26 lbs), burbot (22 lbs), and Arctic cisco (8lbs), amounting to less than 1 percent (Table 12).

In Study Year 2, fish were harvested in all but three months (November, December and January). Arctic grayling harvests were reported in seven of nine months, Arctic char harvests in six of nine months, lake trout harvests in four of nine months, unknown fish (“Old Man” fish) and burbot harvests in two of nine months, and Dolly Varden harvests in one of nine months (Tables 6, 14, 16, 17, 18, and 20).

Two Dolly Varden harvest sites were reported during “Winter” in Study Year 2 (Ekopuk Creek, Site #9, and Chandler Lake, Site #15; both in April 2003), and the estimated harvest was 15 and 49 fish, respectively. An estimated additional 50 “Old-Man” fish (most likely Dolly Varden) were harvested in March and April 2003, also at Ekopuk Creek (Table 6).

In Study Year 2, there were an additional three river-fishing sites (Anaqtiqtuaq, Char Hole, and Anaktuvuk River (Fishing Sites #8, #11, and #13) where Dolly Varden were harvested, but they were “self-reported” in our surveys as Arctic char. As mentioned previously, fishing sites for Arctic char located at rivers/creeks will be considered as producing Dolly Varden. This matter is more fully expanded upon in the “Discussion” section of this report.

All “Winter” and “Summer” fish-harvest sites recorded as accessed in Study Year 2 were located well inside the previously defined community-based subsistence fishing area (Figure 11).

Fishing methods reported for Dolly Varden in Study Year 2 were “hook-and-line” in both seasons, with jigging (using a handline or small rod) a lure under the ice in “Winter” and rod-and-reel fishing the preferred “Summer” method.

Household fishing site access in Study Year 2 in “Winter” was mainly by snowmachine (but included a few instances of ATV access), and access in “Summer” was mainly by ATV (but included a few instances of access via pickup truck and on foot).

The estimated number of community households active in the Dolly Varden fishery in Study Year 2 was one (Ekopuk Creek, April 2003). However, as mentioned earlier, all Arctic char catches from river/creek sites were classified as Dolly Varden harvests. In Study Year 2, an additional three sites at river/creek locations (Fishing Sites #8, #11 and #13) reported “Winter” and “Summer” harvests of Arctic char (Table 14). Inclusion of these fish in the overall Dolly Varden harvest for Study Year 2 is presented in the “Discussion” section.

Sharing of fish harvested among households in Study Year 2 is presented in Tables 10 and 11. An estimated 37 percent of households fished during the “Winter” season, and an estimated 65 percent of households used fish in that season. During “Summer” an estimated 28 percent of community households harvested fish, and 43 percent of households were estimated to use fish in that season.

The 26 fishing sites recorded as used in Study Years 1 and 2 are roughly located within an elliptically-shaped area ca. 20 miles wide by 90 miles long, with its long axis oriented roughly east-west (Figure 10) and fitting well inside the community-based subsistence fishing area defined by local fishers in the late 1970s (Figure 11).

Fourteen of 26 recorded fishing sites in the 2 study years were located within 8 miles of the community, and of the remaining, 7 were located at 30 to 35 miles to the west, and 5 were located generally east, up to 50 miles away from the community.

Distant lakes to the east, such as Shainin Lake (Fishing Site #20) and Itkillik Lake (Fishing Site #19), and to the west, such as Little Chandler Lake (Fishing Site #21), Amitchuaq (Fishing Site #26), and Loon Lake (Fishing Site #23), were accessed by snowmachine, and only during “Winter.”

Of the fishing sites reported in this study, three (Fishing Sites #1, #7, and #15) were used at some time in each season during both study years, five were used in three seasons, ten were used in two seasons, and eight were recorded as used in only one season (Table 3).

### ***B. Natural History Information and Ethnography***

Collection of natural history information for this project included twelve completed interviews. Additional key-informant interviews were planned but not completed due to coordination difficulties.

Raw data sets from completed interviews consist of 8 hours of audio tape, over 25 pages of transcription notes from the taped interviews, and a base map (USGS 1:250,000) with master acetate overlay portraying harvest sites, winter Dolly Varden concentration sites, fish spawning areas, and other mapped information offered by respondents.

Information collected from respondents with respect to Dolly Varden and other harvested fish species represents a substantial body of information and a significant source of traditional knowledge accumulated through generations of living in the central Brooks Range. Information obtained in these interviews falls into the following categories: 1) Native terms and systematics; 2) life history, seasonal movements and spawning areas; 3) traditional and contemporary harvest methods; 4) relative abundance; and 5) traditional stories, myths and beliefs. This and other ethnographic information collected is embedded in the second section of this project, administered by the North Slope Borough Planning Department, and carried out by staff from the Simon Paneak Memorial Museum in Anaktuvuk Pass (Spearman 2005).

In terms of Inupiaq names of fish, we found that those in use today for key species have not changed other than in orthography, as the language is gradually transitioning into unified spelling rules across the North Slope. We did not obtain interviews in which detailed information on systematics was provided, but there was general agreement among informants that Arctic char, Dolly Varden, and “Old Man” fish are all closely related, as are the two types of whitefish (round whitefish and Arctic cisco) caught in the Brooks Range and the northern foothills. The remaining key fishes harvested by the Nunamiut (Arctic grayling, burbot) are clearly not seen as related to one another or the other commonly harvested fishes.

Considerable information on fishing in general and fishing methods (including some in little use, such as impoundment and fish traps) was obtained in ethnographic interviews. Detailed information on fishing, fish species caught, harvest locations, and description of technology are addressed in the following ethnographic report sections: “Distribution of Fish Common to the Brooks Range,” “Fish in Oral Nunamiut Tradition,” “Traditional Fishing Methods and Technologies,” and “Traditional Ecological Knowledge and Nunamiut Fishing” (Spearman 2005).

Key-informant sessions discussing, naming, and locating fishing sites and traditional Nunamiut use of fish on the north side of the Brooks Range were also recorded. Summary notes from these tapes were used in preparing the ethnographic report.

### ***C. Biological Sampling***

Sampling of “Winter” 2001-2002 catches from Anaktuvuk Pass residents was not possible due to the late start-up of the study. By the time staff was organized and ready to sample fish from this period, none could be obtained in the community.

Four fin-clip samples from two distinct locations were obtained from the “Summer” 2002 fishery. In spite of an increased effort to obtain summer samples in 2003, none were made available by fishers. Though disappointing, this poor result is a reflection of the local fish

utilization pattern during summer, where fish are largely consumed in the field and there is great demand among residents for the few brought back to the community.

Winter sampling was more successful in Study Year 2. We obtained 195 fin-clips from Dolly Varden, Arctic char, and “Old Man” fish (probably a dwarf variety of Dolly Varden) during the “Winter” 2002-2003. Sample access was much better due to larger individual catches and less consumption of harvested fish in the field. Furthermore, general environmental conditions (cold to very cold temperatures) and household storage of fish in outside cold storage or freezers contributed to the significant increase in samples obtained. Samples were recorded with a unique accession number (sample number) as well as date and place harvested.

#### ***D. Capacity Building***

Developing local capacity in Anaktuvuk Pass to effectively participate in all phases and facets of this project, Study Objective #6, was accomplished through the hiring of a local resident as a research assistant. The research assistant, Ms. Cheryl Hugo, received careful training from the PI and initially “job shadowed” at the very beginning of the project. She quickly gained the confidence and knowledge needed to perform all assigned project tasks as expected. Furthermore, Ms. Hugo also gained valuable experience in project completion through participation in discussion of project findings and in review of project status, annual, and final draft reports.

Community capacity to undertake and monitor local resource-related projects was enhanced through assisting and engaging staff from the City of Anaktuvuk Pass in the following ways: project fiscal oversight as well as working with the local Tribal Office in review of the proposed harvest survey instrument, monitoring survey progress and performance, assisting in the design and implementation of biological sampling of subsistence-harvested Dolly Varden, and monitoring the performance of the project’s research assistant through regular project reports presented at City Council meetings. Finally, consultation with City and Tribal officials during project-report preparation and participation by their staff in review of the draft final report also served as local capacity-building mechanisms to foster effective collaborative research.

### **DISCUSSION**

According to Campbell “...fishing is a very old cultural trait in high Brooks Range localities, and it is probably one which has been a continually operative method of food



procurement” and, as such, “... probably for several thousand years” (Campbell 1962: 111, 115). As evidenced by this study, fishing by Nunamiut residents of Anaktuvuk Pass, living in the heart of the Brooks Range, continues as a strong cultural and socio-economic activity in both summer and winter.

Estimated community harvest of fish in Study Year 1 (5,357 lbs) and Study Year 2 (4,284 lbs) compares favorably with the earliest estimates made of community harvests dating back to 1973 by Patterson (1974) and 1995 by Brower and Opie (1996). Patterson (1974) calculated that the 1973 estimate of approximately 4,000 lbs of fish represented about 3 percent of the community diet; Brower and Opie (1996) estimated that fish represented 4 percent of the annual community harvest in 1995; while Gubser estimated, based on mainly qualitative measures, that fish ranged from 10 to 20 percent of the traditional Nunamiut diet depending on availability of caribou and other fallback resources (Gubser 1965: 252).

During the course of this two-year study, we did not attempt to measure the entire community harvest input from all sources, but our observations were that hunting, fishing, and gathering success was within “normal” range each year. Thus we are comfortable assuming that the estimated annual community fish harvest for each study-year likely represents three to four percent of the total annual community harvest of all resources, as has been suggested.

Though based on cursory observation, we note that increased local employment and income opportunities have resulted in a larger proportion of cash in the mixed cash-subsistence economy in the community since Patterson (1974) developed his community resource-harvest estimate; however, local harvest of fish is not showing signs of decreasing. In fact, when recalling that fish was a common working-dog food in Anaktuvuk Pass into the 1970s (Gubser 1965; Nelson 1982; Spearman 1979) and since there are now (2003) no actual working dog-teams in the community, fish is as important a community food resource today as it was in the 1960s and 1970s.

Fishery observations from Anaktuvuk Pass by Campbell (1962), Gubser (1965), and Ingstad (1954) suggest that the annual subsistence fish harvest at the time of their reports was composed mainly of Arctic grayling followed by burbot, Lake trout, and Arctic char (from both river and lake sources). In Study Year 1 (October 2001 through September 2002), Arctic grayling was by weight the most commonly harvested fishery resource (Table 9), and Dolly Varden/Arctic char and Lake trout ranked distant second and third in terms of estimated pounds harvested.

This condition changed in Study Year 2 when Arctic char/Dolly Varden was the highest-ranking fishery resource by estimated weight of harvest (1,912 lbs), with Arctic grayling and Lake trout trailing by some 700 lbs in terms of weight (Table 12). In the absence of time-series data on the variability of the total community fish harvest, species composition, or community harvest effort, we can only say with confidence that the same species are still represented in the community harvest, and that variation in the overall harvest contribution made by a particular fish species can change considerably from year to year.

Subsistence harvest production by “season” in 2001-2002 showed variation in terms of total useable weight, with the “Winter” harvest estimate being nearly 50 percent higher than the “Summer” harvest estimate (Tables 7 and 8). This condition was also reflected in the seasonal harvest difference for Study Year 2, where the estimated “Winter” harvest of fish was nearly three times that of the summer harvest (Tables 10 and 11).

Estimated “Winter” season harvest totals for Study Year 1 and 2 were close (Tables 7 and 10), whereas the two “Summer” harvest estimates were not (Tables 8 and 11). Harvest effort was similar in the two “Winter” seasons (Tables 7 and 10), whereas the “Summer” effort (measured in estimated number of households attempting to harvest and those who reported harvesting) in 2003 was about half that reported for 2002 (Tables 8 and 11).

One possible explanation for the observed “Summer” harvest production and effort decline from 2002 to 2003 could be related to availability of summer employment in the community. Based on conversations with community leaders, it is clear that there is usually more seasonal employment available during the summer months, but we were unable to confirm that there indeed was a measurable difference in summer employment from 2002 to 2003.

The greatest difference in harvest production between the two “Summer” seasons is reflected in “char” and Lake trout harvests which were down by 90 percent combined, whereas the Arctic grayling harvest was down by about 40 percent (Tables 8 and 11). According to our records, Arctic grayling harvest locations utilized in 2003 were generally located closer to the community, and fewer households harvested at these sites than in the previous summer.

The number of households using more distant and productive Lake trout and “char” fishing sites was also down significantly, further supporting the idea that fishers traveled less and fished less due to greater availability of summer employment in 2003. Since we have no strong measure of actual household effort (such as catch-per-unit effort [CPUE]), it is not possible to clearly see if there was any additional reason, such as low abundance of Arctic grayling, which contributed to the low “Summer” 2003 community catch estimate.

We are skeptical that fish abundance was an issue, for at no time did we hear from fishers that there was a lack of Arctic grayling or “char” at fishing sites in the summer of 2003. However, in order to bring more clarity to issues such as this, future subsistence fishery harvest assessment studies in Anaktuvuk Pass may want to include CPUE measures to help sort out community economics from potential fishery management issues.

Finally we discuss the significance of Dolly Varden harvests in the community subsistence resource economy. Based on observations of the role of Dolly Varden as one of the most important fish species harvested in terms of numbers harvested, and based on local preferences in many other North Slope Borough communities, sources suggest that the same condition might naturally apply to Anaktuvuk Pass (Craig 1987; Fall & Utermohl 1995; Pedersen 2000; Scott et al. 2000). It was generally thought, furthermore, that the majority of Dolly Varden taken in the Anaktuvuk Pass fishery, as in many other North

Slope Borough community fisheries, was anadromous and harvested in mixed stock fisheries within and outside of federal conservation units (U.S. Fish and Wildlife Service 2000).

In addition, community representatives from Anaktuvuk Pass have at various times formally expressed concerns about protecting overwintering areas and maintaining sustainable “char” (Arctic char and Dolly Varden) populations in such forums as, for example, the December 2000 North Slope Fish and Game Management Committee meeting in Barrow, Alaska. Because of the importance of the Dolly Varden and Arctic char stocks to local subsistence users, and due to the lack of current comprehensive fish-harvest assessment information for the Anaktuvuk Pass subsistence fishery, a specific goal in this project was to take a careful look at local Dolly Varden harvests.

As noted in the “Results” section, the term “char” as used in Anaktuvuk Pass can mean Dolly Varden, Arctic char, or even “Old Man” fish, the presumed dwarf form of Dolly Varden present at some fishing sites. Based on current life-history information for Arctic char and Dolly Varden on the North Slope, we determined that any reported “char” harvest in the Anaktuvuk Pass household surveys for the study period could, with accuracy, be classified on the following basis: Any “char” harvested at a river/stream site would be classified as Dolly Varden, and any lake harvest would be classified as Arctic char (Mecklenburg et al. 2002; DeCicco pers. comm. July 2005; Burr pers. comm. July 2005).

Employing this classification scheme, we revised the seasonal and annual Dolly Varden harvest estimates for Anaktuvuk Pass. The revised figures reveal that harvests of Dolly Varden in the study period were modest. In Study Year 1, a total of 434 lbs of Dolly Varden was harvested (8% of estimated annual community fish harvest) instead of the reported zero take. The revised estimate for Dolly Varden harvest in Study Year 2 was 98 lbs (up from an estimated 26 lbs), representing 2 percent of the estimated annual community fish harvest (Table 23).

Dolly Varden harvests in Study Year 1 came from five river/stream sites high on the John and Anaktuvuk River drainages (Sites #1, #5, #6, #8, and #9; Tables 4 and 5), and in Study Year 2, they came from four sites (#8, #9, #11, and #13; Tables 4 and 6) similarly situated.

In “Winter” 2001, Dolly Varden harvest occurred in March at one fishing site (Ikiakpuk, Site #6), where an estimated 72 Dolly Varden (202 lbs) were taken by one household “jigging” through the ice (Tables 13, 15, 19, and 23). The “Summer” 2002 estimated community fishing effort for Dolly Varden consisted of an estimated average of one household at each of four sites during the month of July (Sites #1, #5, #8, and #9), and approximately 2 to 3 households harvested Dolly Varden in June at Anaqtiqtauq (Site #8; Tables 13, 15, 19, and 23). The estimated “Summer” 2002 Dolly Varden harvest was 83 fish (232 lbs) (Table 23), and all were taken by rod-and-reel fishing.

The “Winter” 2002 harvest of Dolly Varden was estimated at 76 lbs (composed of an estimated 40 lbs of “Old Man” fish and 36 lbs of “regular” Dolly Varden) and produced by up to 2 households jigging thorough the ice in the months of February, April, and May at

Ekopuk (Site #9) and in May at the Char Hole (Site #11; Tables 14, 16, 17, 18, 20, 21, 22, and 23). Two sites, Anaqtiqtuaq (#8) and the Upper Anaktuvuk River (#13) produced the estimated 22 lbs (8 fish) harvested in the “Summer” 2003 fishery (Table 23). Fish were harvested by an estimated one to two households fishing in August and September (Tables 6 and 14) by means of rod-and-reel fishing.

Annual Arctic char harvest estimates were slightly reduced by the revised Dolly Varden figures, and in Study Year 1 this resulted in the Lake trout harvest estimate rising to the second-ranking fishery resource after Arctic grayling. As a consequence, Arctic char, with an estimated harvest of 1059 lbs, slipped to a close third place for the year. In Study Year 2 the revised Arctic char harvest estimate fell only slightly (from 1,886 lbs to 1,814 lbs) and remained as the high-ranking estimated species harvest by weight for the year.

Clearly then, Dolly Varden was a minor but not insignificant fishery resource in the two study years, and casual discussions conducted by the report authors with knowledgeable fishers generally supported the finding. However, mention was made by fishers of a presently underutilized winter harvest site (Aaqhaluriam Siiqsinnгаа), located at the confluence of the Kanaut River with the Anaktuvuk River, that, in the not too distant past, produced large “Winter” catches of Dolly Varden. Also, some fishers recalled an unnamed site on the upper Nanushuk River where large winter catches of Dolly Varden were produced some 20-30 years ago.

When earlier authors have referred to significant catches of “char” or Arctic char by residents of Anaktuvuk Pass (Brower and Opie, 1996; Campbell 1962; Gubser 1965; Patterson 1974), they were most likely referring to Arctic char not Dolly Varden, unless the community fishing pattern at that time was more river-oriented than what it is now.

Sharing of locally harvested fish was common among community households in the study period. In “Winter” 2001-2002 (Study Year 1) an estimated 39 percent of households harvested fish, and an estimated 65 percent of community households used fish from that harvest. The “Summer” 2002 (Study Year 1) estimate showed that with 56 percent of community households harvesting fish, an estimated 78 percent of households used locally harvested fish in the period.

Household sharing of fish harvests in the “Winter” season in Study Year 2 were similar to estimates from the previous study year. An estimated 37 percent of households harvested fish during the “Winter” 2002-2003 season, and an estimated 65 percent of households used locally harvested fish in that season. However, the estimated household harvest participation and sharing were lower than for the same season in Study Year 1. In “Summer” of 2003 (Study Year 2), an estimated 28 percent of households fished, and 43 percent of community households used locally harvested fish in the period. These figures are nearly half of the previous “Summer” season estimate, and likely the result of a particularly high rate of summer employment in the community. Informal discussions with active harvesters supported this contention, but formal community statistics were not available to confirm this conclusively.

Descriptive information on traditional harvest and use by the Nunamiut of fishery resources in the central Brooks Range was prepared as part of this study. However, comparisons with current fishing practices, technology used, species caught, or areas used was not carried out. In a future fishery project in Anaktuvuk Pass, an objective to undertake such a comparison needs to be included. This is of particular importance in light of ongoing gas exploration in the foothills of the Brooks Range east and west of the Anaktuvuk River, an area that comprises important wildlife and fisheries component of the Nunamiut subsistence harvest area and traditional home range.

Information from this study addresses core issues raised by the community and noted by the North Slope Regional Advisory Council (USFWS 2000). Results from this work, taken together with what is already known from other studies on movement, distribution, abundance, and ecological requirements of fish in the northern foothills and central Brooks Range, help inform management of the resources that have been and continue to be of key importance to residents of Anaktuvuk Pass. It is also clear from this work that area residents are concerned about these resources, possess intimate knowledge about them, and welcome any opportunity to actively participate in local fishery management, planning, and policy-making.

Biological sampling of Dolly Varden/Arctic char was very low in Study Year 1 (2001-2002). In part this was due to a late start of the project, which resulted in missing the most productive local harvest period (spring ice-fishing) for the target species. In addition, incomplete understanding of fisher behavior during the “Summer” also prevented successful collection of specimens.

“Summer”-caught fish are not brought back to the community, but are consumed at or near the particular fishing site. Lack of understanding of this relatively simple condition by the project leader resulted in only four samples being obtained during the summer of 2002. Adapting to this condition and having sample collection staff visit favored fishing sites near the community improved “Summer” sampling in 2003. “Winter” sampling was very successful in the spring of 2003, with nearly two hundred samples being obtained of Dolly Varden/Arctic char from traditional Nunamiut fishery harvest locations. As we were not particularly successful due to a late project start-up in 2002, we were ready in the spring of 2004. However, due to a series of fiscal problems experienced by the City of Anaktuvuk Pass, the community project assistant could not be hired in time to visit fishing sites. In the Spring of 2005, a small but significant fiscal contribution was made by FWS to the North Slope Borough for the express purpose of facilitating completion of local project information, draft report reviews, and final report preparation.

Fishing households in Anaktuvuk Pass were very supportive of this project and made a special effort to “share” their catch with the scientific community. Residents expressed a strong interest in learning more about the Dolly Varden/Arctic char populations that they rely on for cultural and nutritional sustenance, and how these fish relate to other “char” stocks on the North Slope and in the circumpolar Arctic. Though results of the genetic sampling of this project are not yet available, we encourage FWS to present results of that

important work to the community. Presenters of that information will find an engaged, intrigued, and appreciative audience in the Nunamiut of Anaktuvuk Pass.

This report clearly documents that fishing continues as a traditional seasonal household activity, and that harvest proceeds are generously shared throughout the community of Anaktuvuk Pass. Though the diversity of fish harvested is limited compared to what is available within the resource area of other North Slope communities, the estimated annual community fish harvest is respectable. Fish harvests, especially those in winter, are shared widely among community households, thus providing a welcome dietary change and serving the important role of maintaining central Inupiat and Nunamiut cultural values.

Finally, results of this project demonstrate that training and practical guidance of local staff in systematic and informal data collection as well as participation in the reporting process, or “capacity building,” was successfully accomplished. In addition, local institutions demonstrated that they can recruit capable local staff to support an important resource-management activity, and that they also are able to manage agency contracts in support of specific performance and product objectives.

## **RECOMMENDATIONS**

Community participation in and contribution to this study demonstrate that local capacity can be developed to effectively participate in resource monitoring and documentation of traditional knowledge, both of which are key areas in shaping effective resource management and planning.

Developing local capacity to participate in this study was heartily embraced by community residents and their representatives. It was seen as another avenue for the community to diversify and bolster its work force and economy, while also developing skills to provide and communicate information on traditional use of the land and resources in the central Brooks Range. Being able to work closely with a trained member of the community informed this project in many tangible and intangible ways.

Capacity development, however, needs to be placed in a broader context. For instance, projects such as the one described in this report need to offer continuing opportunity for the community to utilize developed capacity and build on it. Interest in this work was high in Anaktuvuk Pass, and as has been pointed out, the need for follow-up studies, such as a basic stock assessment of locally harvested fish stocks, shedding light on systematics of the three local “chars,” and continuing the effort to build a community subsistence fishery-harvest database, is evident.

Energy resource exploration on federal and state land in the area utilized for subsistence harvest production, including fish, by Anaktuvuk Pass residents is rapidly expanding in the

northern foothills of the Brooks Range. Already there is a growing need for basic descriptive, spatial, and quantitative assessments of area resource values. Utilizing locally developed capacity to assist in meeting such information needs would be an excellent way to improve the capture of local perspectives in land and resource management, planning, and policy-making.

This two-year fishery harvest assessment represents the first systematic effort to describe and quantify species used, amounts harvested, the seasonal harvest cycle, and harvest areas used by residents of Anaktuvuk Pass. In light of increasing industry interest in the oil, gas, and mineral resource potential within the northern part of the community's traditional and contemporary subsistence fishing area, and based on the cultural and economic significance of the fishery, community representatives recommend that this study be continued as a longterm fishery-monitoring project administered by the community in cooperation with ADF&G and the funding agency.

Vulnerability of the community subsistence fishery to disturbance, global warming, and more conservative regulation due to limited information on the stocks being harvested are expressed local concerns. Limited availability of temporal, quantitative, and spatial subsistence harvest information, as well as unresolved systematic questions regarding the economically important "char" (Arctic char and Dolly Varden) fishery, are additional issues that the authors recommend be addressed. This is particularly urgent, as more robust resource and resource-use information is needed to guide planned energy-resource exploration, and possibly development and production, within the community's subsistence use area.

We recommend that efforts be made to implement a longitudinal community subsistence fishery-harvest assessment project, to place ethnographic (descriptive) information on the fishery (produced in the companion report by G. Spearman 2005) in a concurrent analyzable context with obtained harvest assessment information, and to significantly improve area fish-stock identification and management information. Ideally, the recommended projects would build on local project-participation capacity developed in the course of this study and, by design, allow for increased local participation in local fish studies, stock management, and planning efforts.

## **ACKNOWLEDGMENTS**

The authors would like to thank the City Council of Anaktuvuk Pass for their strong support of this project, and the people of Anaktuvuk Pass for their patient participation in household surveys and their willingness to share their traditional knowledge about the central Brooks Range fishery resources. We are indebted to the elders, city and tribal personnel, and village residents who participated in or helped with making this project a success.

Sincere thanks also go to Mr. Bob Walker and Mr. Dave Caylor, Division of Subsistence Information Management Section, who provided valuable support in data analysis and review; Dr. Jesse Dizard, Research Director for the Division of Subsistence, for research process support; and Dr. Jim Simon, Interior/Western/Arctic Regional Program Manager for the Division of Subsistence, for patient project oversight and editorial recommendations.

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## FIGURES

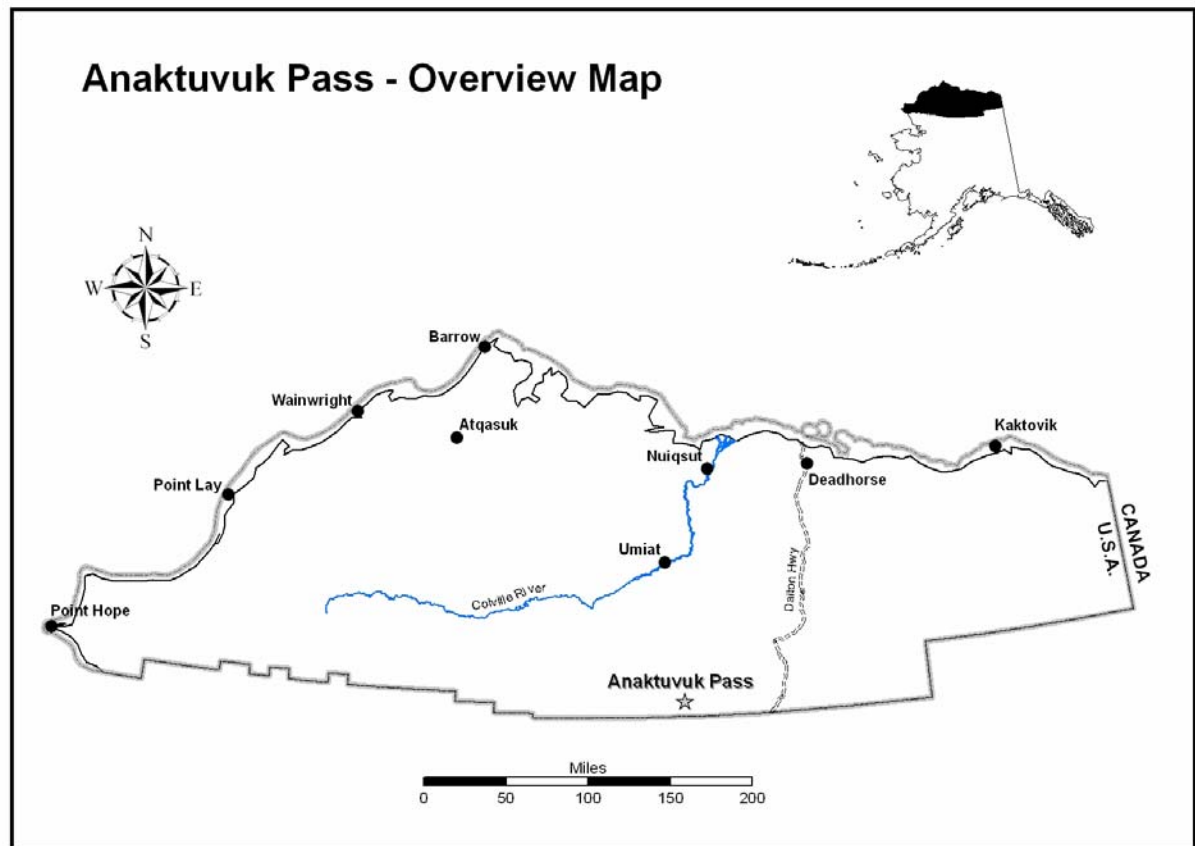


Figure1. The North Slope Region and Location of Study Community.

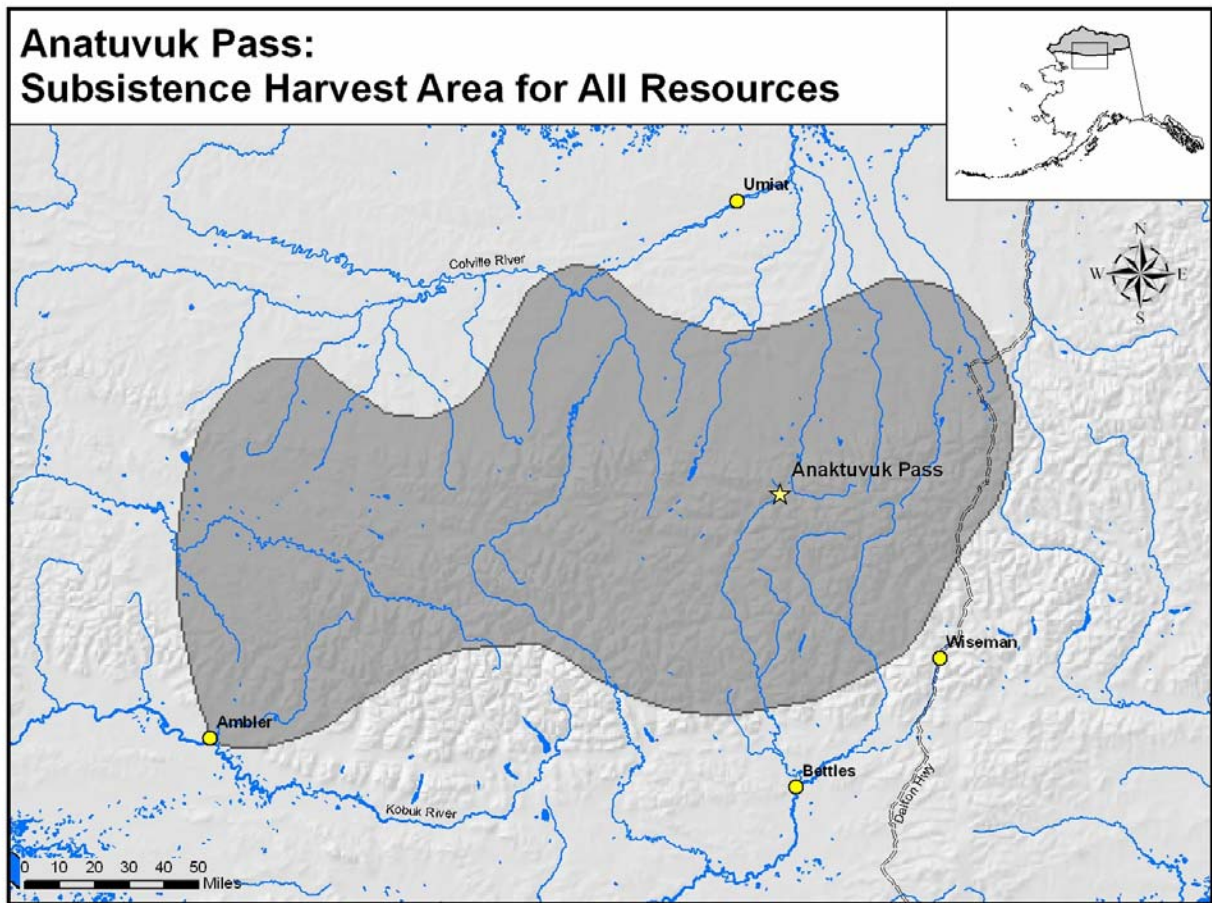


Figure 2. Community Based Subsistence Harvest Area, All Resources, Anaktuvuk Pass. Source: Pedersen 1979.

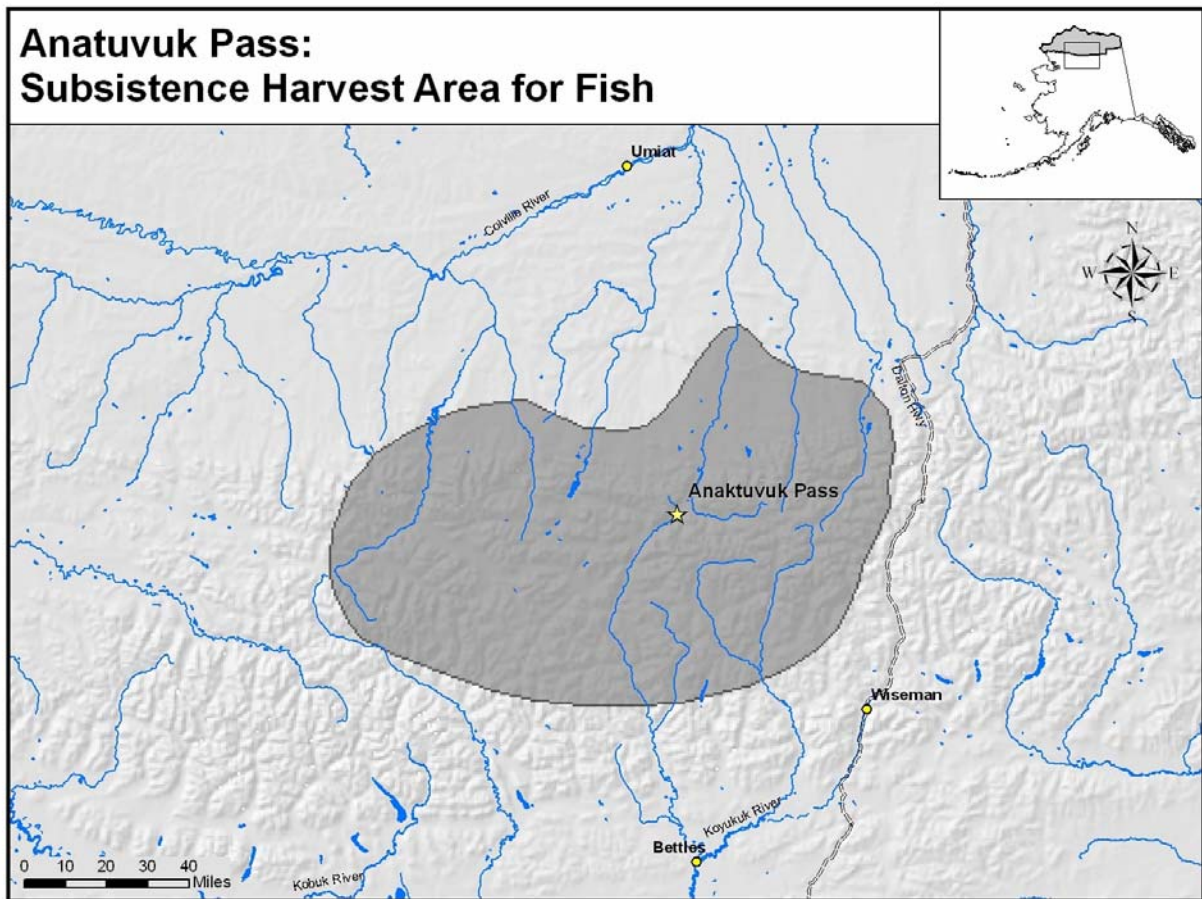


Figure 3. Community Based Subsistence Harvest Area for Fishing, Anaktuvuk Pass.  
Source: Pedersen 1979.

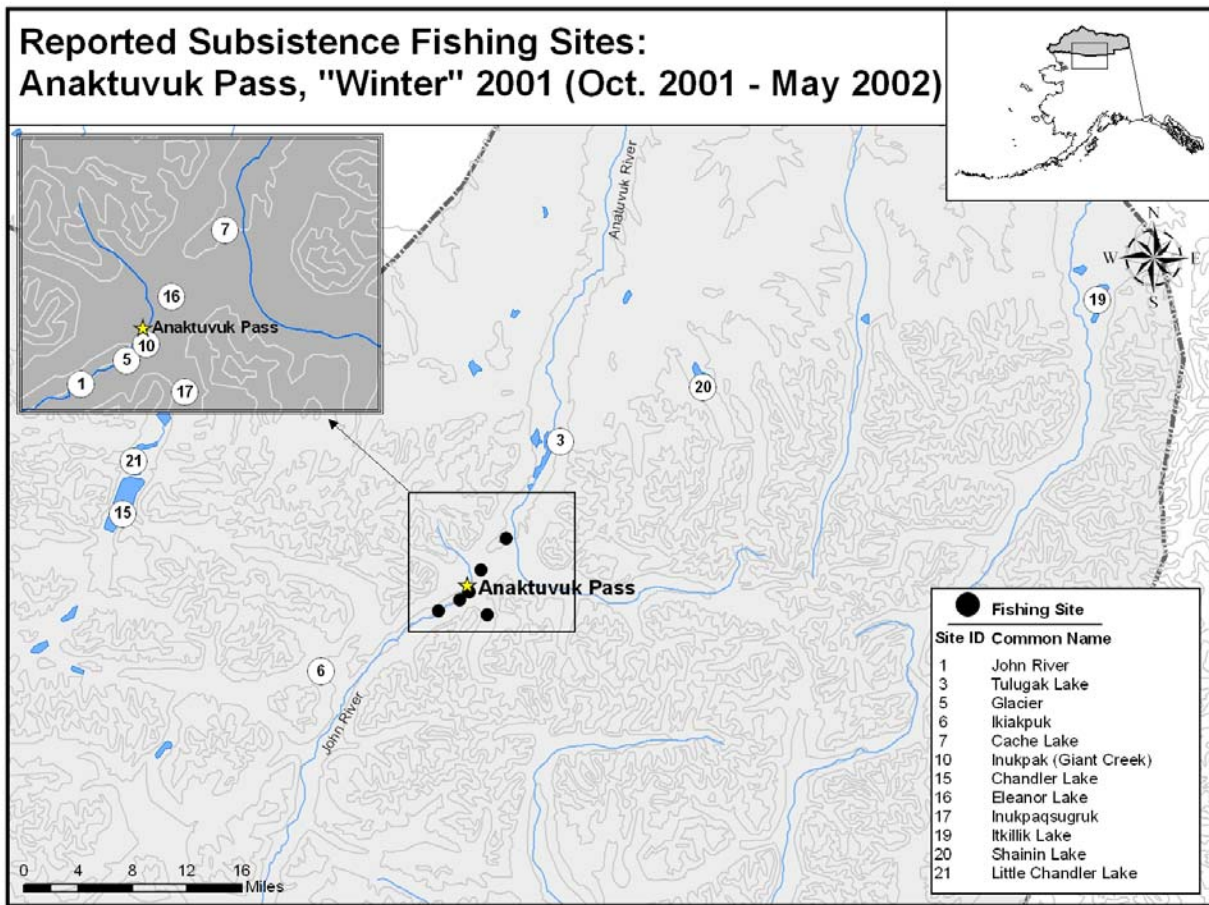


Figure 4. Reported "Winter" 2001 (October 2001 through May 2002) Subsistence Fishing Sites, Anaktuvuk Pass. Source: Pedersen and Hugo 2005.



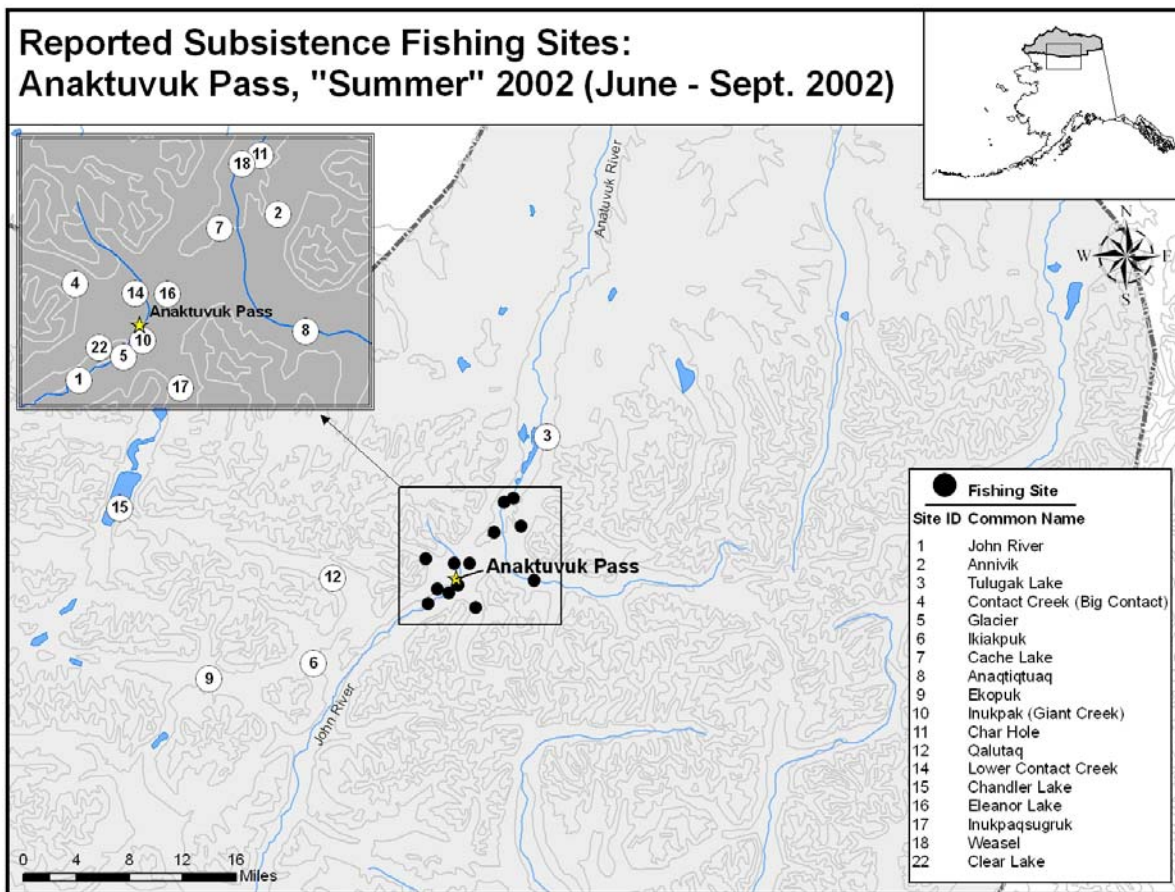


Figure 5. Reported "Summer" 2002 (June 2002 through September 2002) Subsistence Fishing Sites, Anaktuvuk Pass. Source: Pedersen and Hugo 2005.

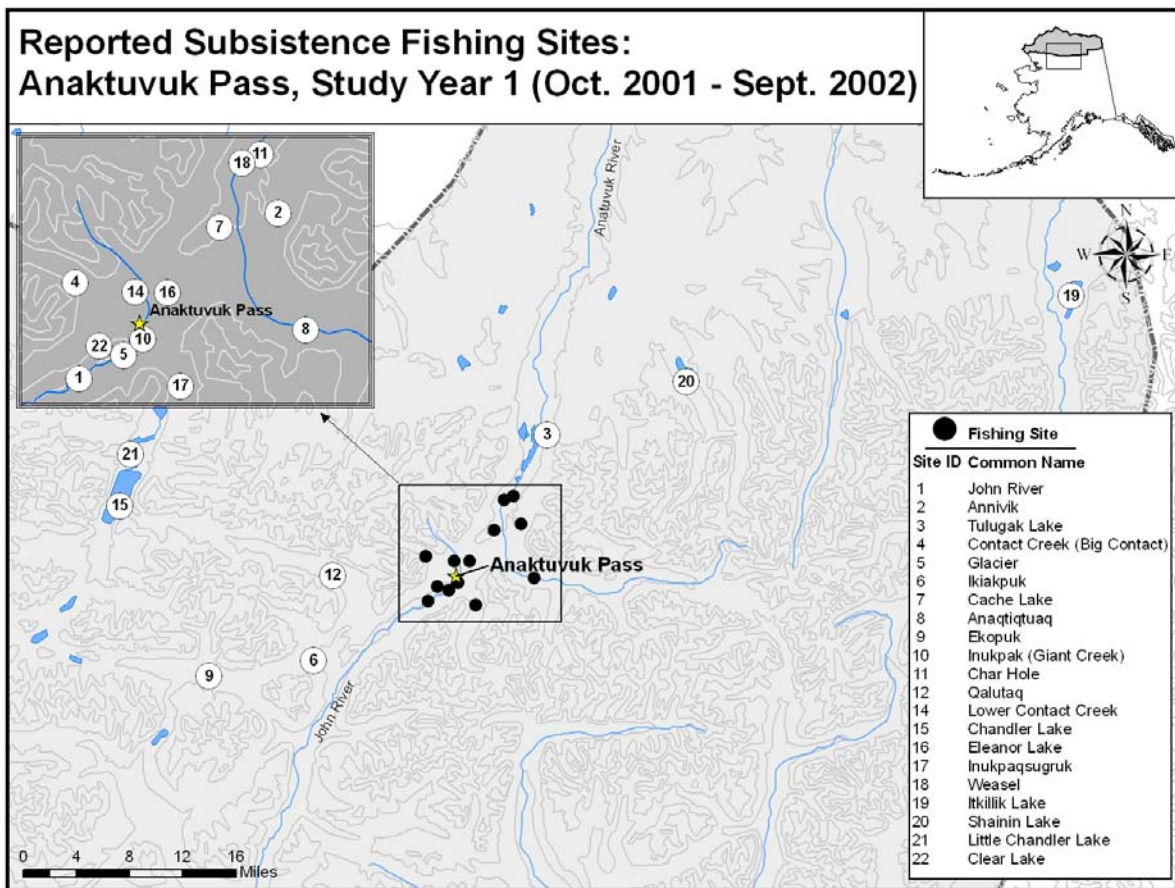


Figure 6. Reported Study Year 1 (October 2001 through September 2002) Subsistence Fishing Sites, Anaktuvuk Pass. Source: Pedersen and Hugo 2005.



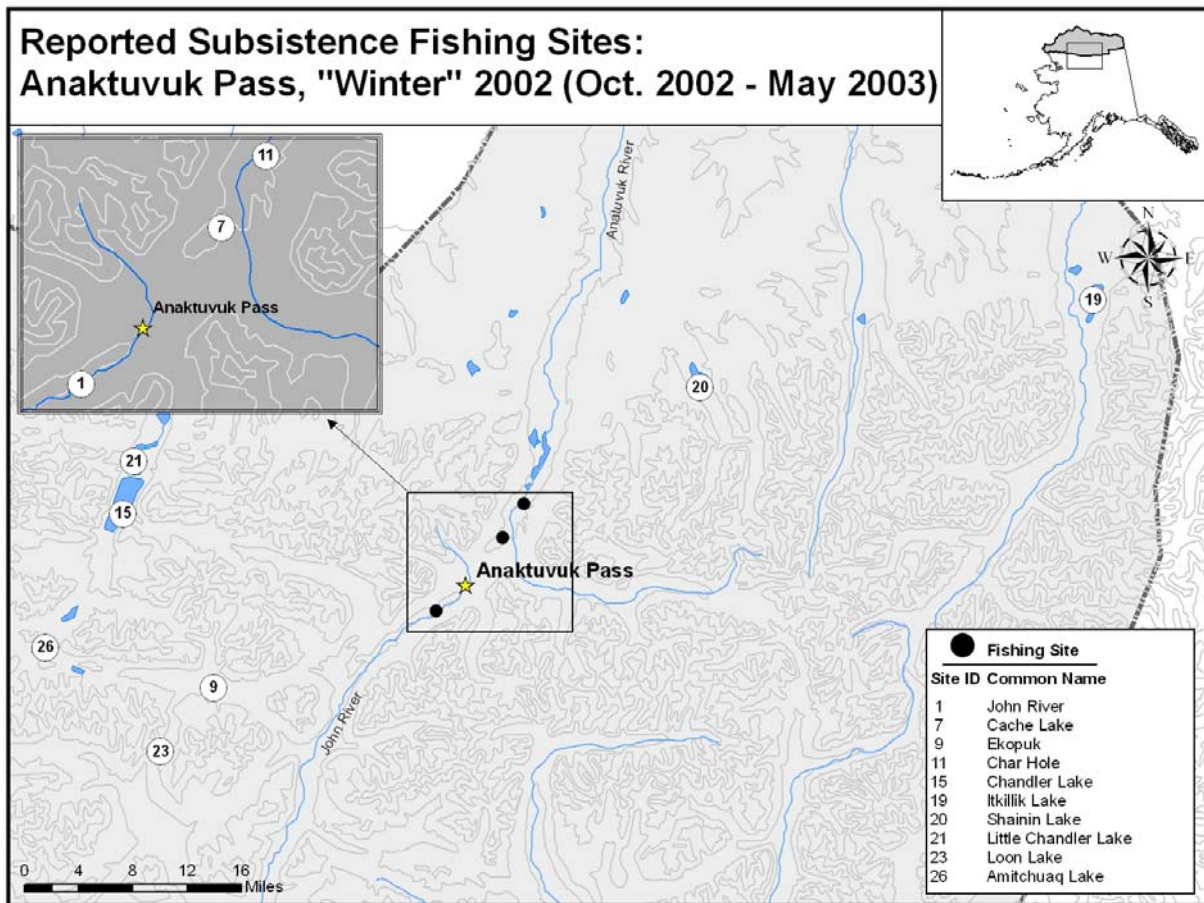


Figure 7. Reported "Winter" 2002 (October 2002 through May 2003) Subsistence Fishing Sites, Anaktuvuk Pass. Source: Pedersen and Hugo 2005.

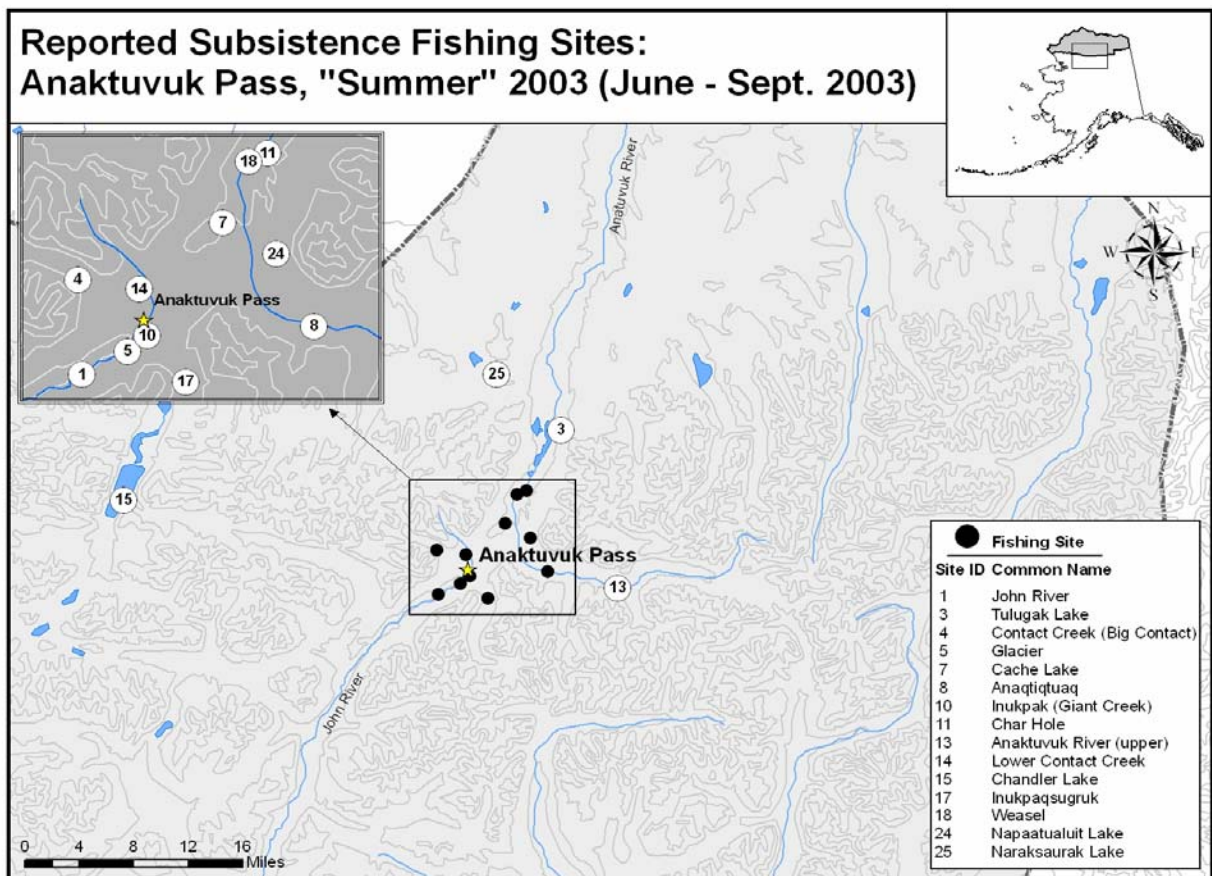


Figure 8. Reported "Summer" 2003 (June 2003 through September 2003) Subsistence Fishing Sites, Anaktuvuk Pass. Source: Pedersen and Hugo 2005.

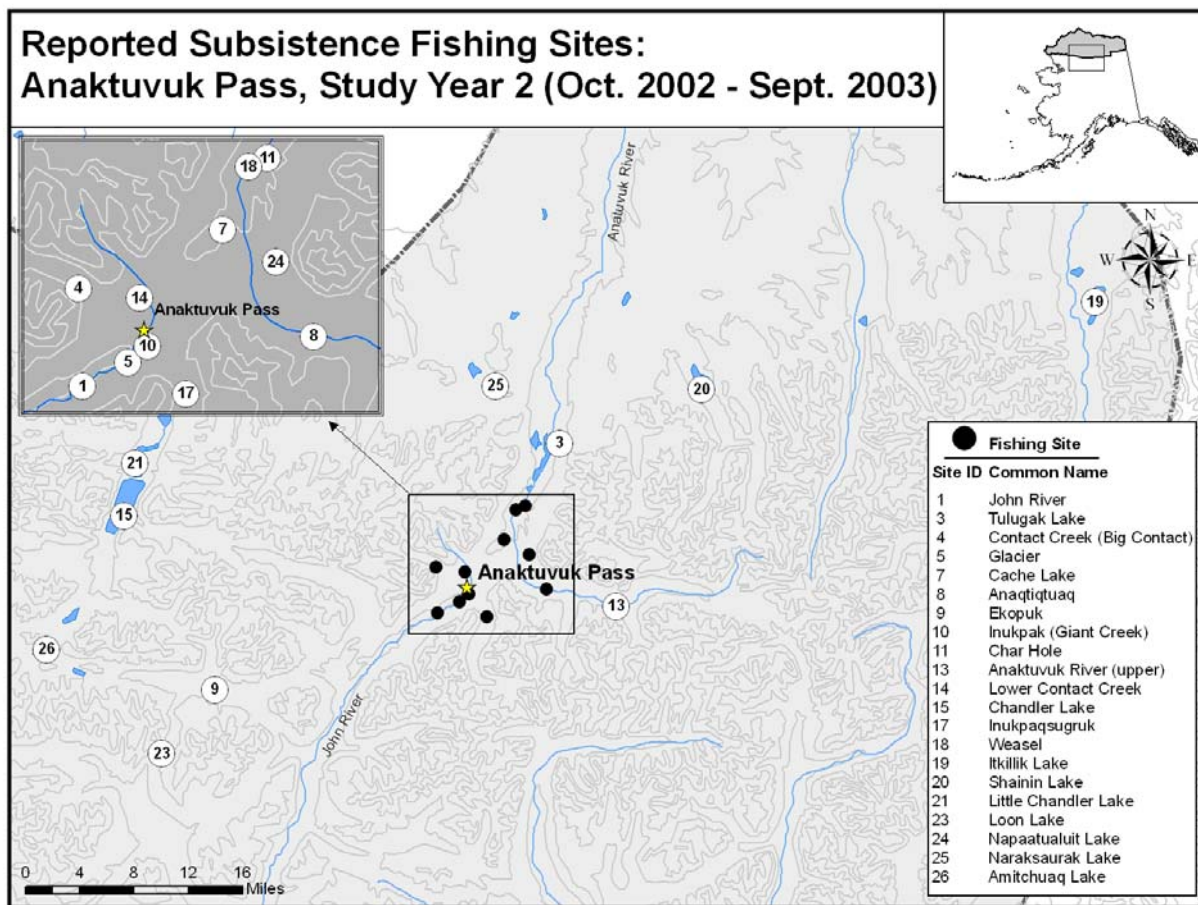


Figure 9. Reported Study Year 2 (October 2002 through September 2003) Subsistence Fishing Sites, Anaktuvuk Pass. Source: Pedersen and Hugo 2005.



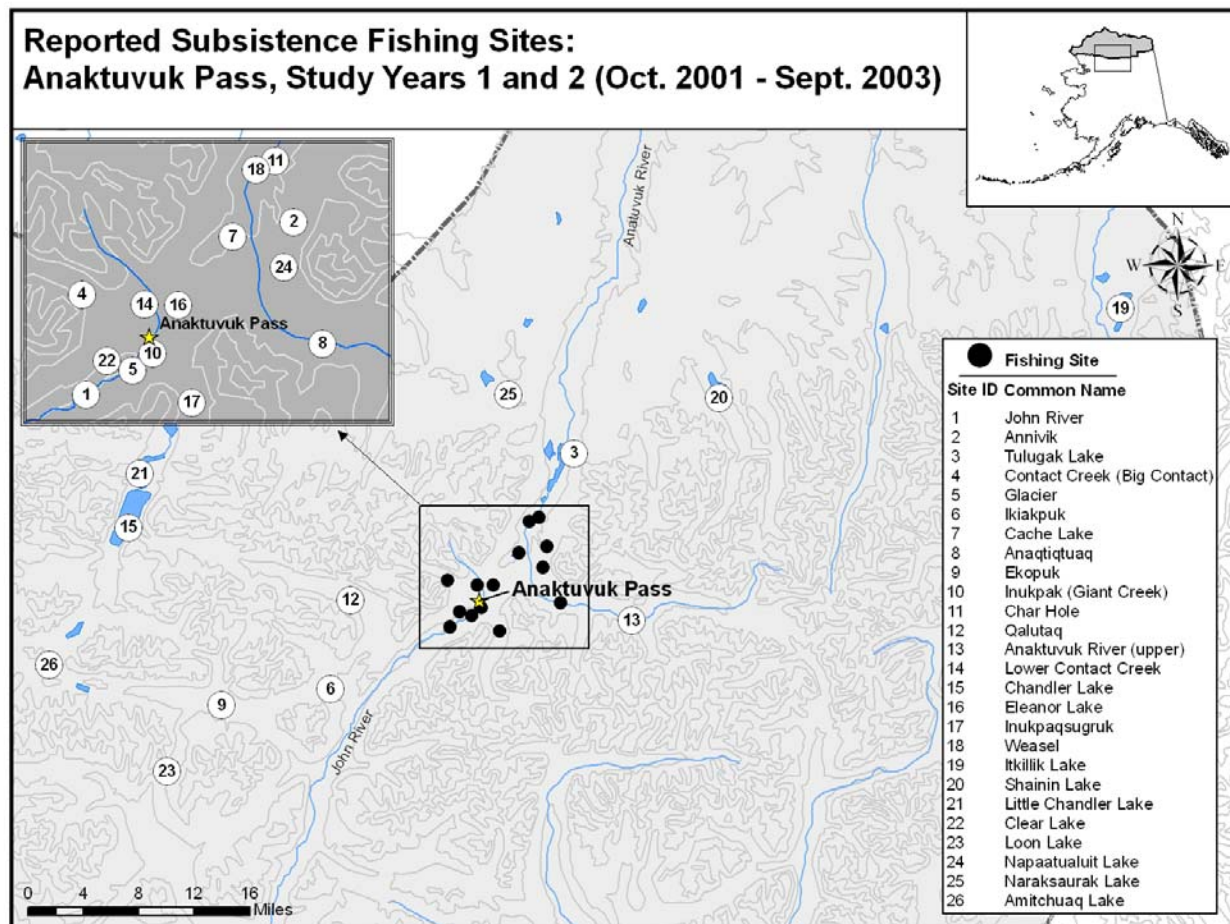


Figure 10. All Subsistence Fishing Sites Used and Season of Use Reported in Study Period (October 2001 through September 2003), Anaktuvuk Pass. Source: Pedersen and Hugo 2005.

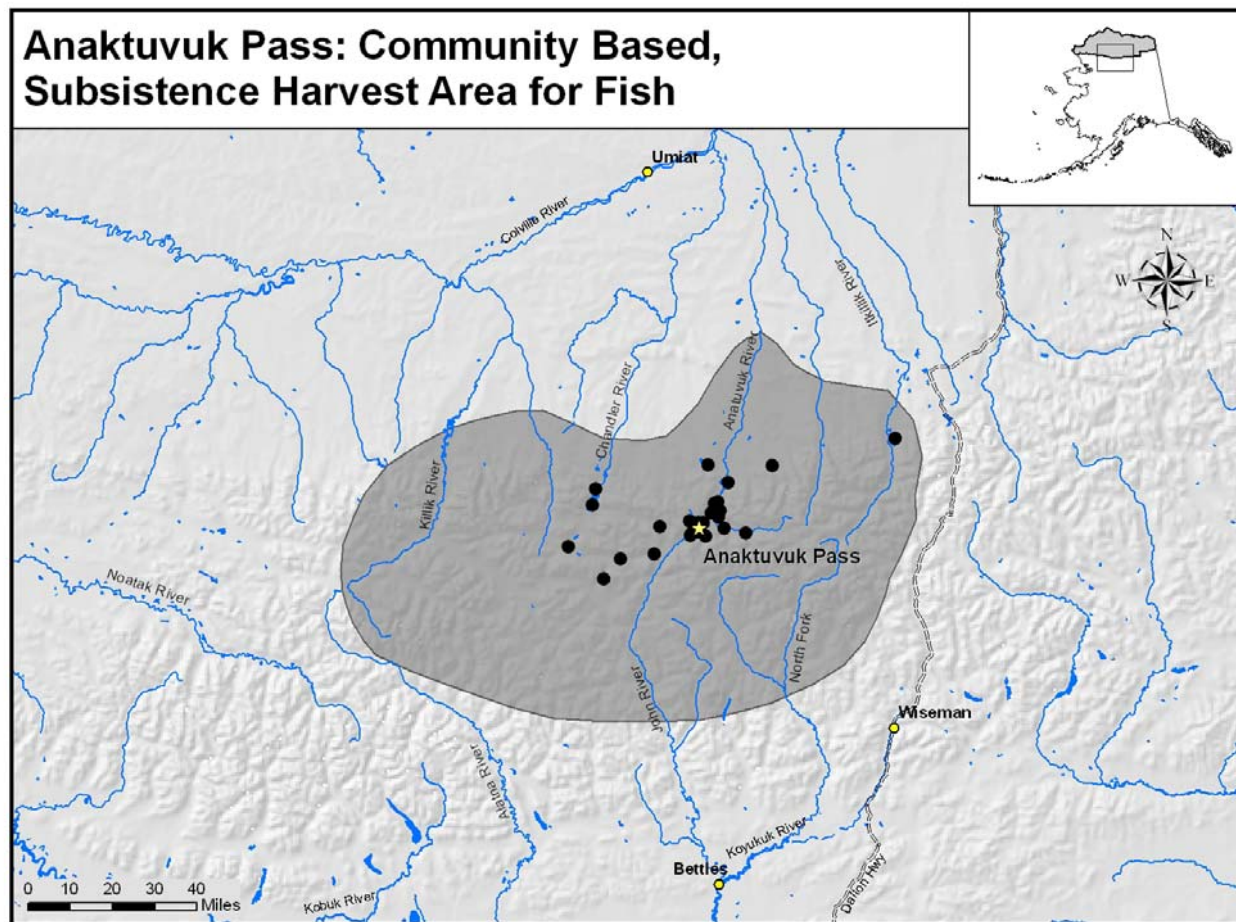


Figure 11. All Subsistence Fishing Sites Reported Used in Study Period (October 2001 through September 2003) in Relation to the Community Based Subsistence Harvest Area for Fishing, Anaktuvuk Pass. Sources: Pedersen 1979; Pedersen and Hugo 2005.

## TABLES

Table1. Fish Species Reportedly Harvested by Residents of Anaktuvuk Pass.

Common	<i>Inupiaq</i>	Scientific (Linnaeus)
Anayuqaksraq Charr*+	<i>Anayuqaksraq</i>	<u>Salvelinus</u> <u>anaktuvensis/malma/alpinus?</u>
Arctic char+	<i>Iqalukpik</i>	<u>Salvelinus alpinus</u>
Arctic cisco+	<i>Qaaktaq</i>	<u>Coregonus autumnalis</u>
Arctic grayling+	<i>Sulukpaugaq</i>	<u>Thymallus arcticus</u>
Broad whitefish	<i>Aanaakliq</i>	<u>Coregonus nasus</u>
Burbot (Ling cod)+	<i>Tittaaliq</i>	<u>Lota lota</u>
Dolly Varden+	<i>Iqalukpik</i>	<u>Salvelinus malma</u>
Humpback whitefish	<i>Pikuktuuq</i>	<u>Coregonus pidschian</u>
Lake trout+	<i>Iqaluagpak</i>	<u>Salvelinus namaycush</u>
Least cisco	<i>Iqalusaaq</i>	<u>Coregonus sardinella</u>
Longnose sucker	<i>Milugiaq</i>	<u>Catostomus catostomus</u>
Northern pike	<i>Siulik</i>	<u>Esox lucius</u>
Pink salmon	<i>Amaqtuq</i>	<u>Onchorynchus gorbuscha</u>
Round whitefish	<i>Savigunaq</i>	<u>Prosopium cylindraceum</u>
Slimy sculpin	<i>Kanayuuq</i>	<u>Cottus cognatus</u>

\*also referred to as “Old-Man Fish” in Anaktuvuk Pass; a form of Dolly Varden.

+ species of fish harvested in the subsistence fishery during the Study Period (October 2001 through September 2002).

Sources: Brower and Opie 1996; Campbell 1961; Mecklenburg et al. 2002; Spearman 2005.

Table 2. Household Sampling, Participation Rates and Population Estimates, Anaktuvuk Pass.

Survey Period	Survey Design	Number of Households	Number of Surveyed Households	Percentage of Households Surveyed	Estimated Community Population	Community Population (U.S. Census 2000)
Winter 2001-2002	Census	82	97	85%	349	282
Summer 2002	Census	77	89	88%	317	282
Winter 2002-2003	Census	83	97	86%	361	282
Summer 2003	Census	95	97	98%	318	282

Source: Pedersen and Hugo 2005; U.S. Census 2000.

Table 3. Subsistence Fishing Sites and Seasons of Use Reported in Study Period (October 2001-September 2003), Anaktuvuk Pass.

Fishing Site Number	Fishing Site Name	Survey Year and Season of Use*			
		2001W	2002S	2002W	2003S
1	John River	X	X	X	X
2	Annivik		X		
3	Tulugak Lake	X	X		X
4	Contact Creek (Big Contact)		X		X
5	Glacier	X	X		X
6	Ikiakpuk	X	X		
7	Cache Lake	X	X	X	X
8	Anaqtiqtuaq		X		X
9	Ekopuk		X	X	
10	Inukpak (Giant Creek)	X	X		X
11	Char Hole		X	X	X
12	Qalutaq		X		
13	Anaktuvuk River (upper)				X
14	Lower Contact Creek		X		X
15	Chandler Lake	X	X	X	X
16	Eleanor Lake	X	X		
17	Inukpaqsugruk	X	X		X
18	Weasel		X		X
19	Itkillik Lake	X		X	
20	Shainin Lake	X		X	
21	Little Chandler Lake	X		X	
22	Clear Lake		X		
23	Loon Lake			X	
24	Napaatualuit Lake				X
25	Naraksaurak Lake				X
26	Amitchuaq Lake			X	

\*W= "Winter" (October through May)

\*S = "Summer" (June through September)

Source: Pedersen and Hugo 2005



Table 4. Subsistence Fishing Sites, Study Year, and Species of Fish Harvested in the Study Period (October 2001-September 2003), Anaktuvuk Pass.

Fishing Site Number	Fishing Site Name	Survey Year and Species* Harvested	
		1(2001/2002)**	2(2002/2003)**
1	John River	D,G	G
2	Annivik	G,C	
3	Tulugak Lake	B,D,LT,G,C	B,LT,G,C
4	Upper Contact Creek	G	G
5	Glacier	D,G	G
6	Ikiakpuk	B,D,G	
7	Cache Lake	LT,G,C	G
8	Anaqtigtuaq	D,LT,G	AC,G
9	Ekopuk	D	D,G,O
10	Inukpak (Giant Creek)	G	G
11	Char Hole	G	AC,G
12	Qalutaq	G	
13	Anaktuvuk River (upper)		AC,G
14	Lower Contact Creek	G	G
15	Chandler Lake	D,LT,G	AC,D,LT,G
16	Eleanor Lake	B,G	
17	Inukpaqsugruk	G	G
18	Weasel	G	G
19	Itkillik Lake	LT,G	B,AC,LT
20	Shainin Lake	D,LT	LT
21	Little Chandler Lake	D,LT	AC,LT
22	Clear Lake	D	
23	Loon Lake		LT
24	Napaatualuit Lake		G
25	Naraksaurak Lake		G
26	Amitchuaq Lake		AC

\*AC= Arctic char; B= Burbot; C= Arctic cisco; D= Dolly Varden ; O=“Old-Man” Fish (Dolly Varden); G= Arctic grayling; LT= Lake trout.

\*\*2001/2002 means Study Year 1 (October 2001 through September 2002) and 2002/2003 means Study Year 2 (October 2002 through September 2003).

Note that lake catches of Dolly Varden (D) should be designated Arctic char (AC), and that Arctic char (AC) catches in rivers and creeks should designated Dolly Varden (D); see “Results” and “Discussion” sections and Table 23 for clarification.

Source: Pedersen and Hugo 2005.

Table 5. Estimated Number of Fish Harvested by Fishing Site, Resource and Month of Fishing, Study Year 1 (October 2001-September 2002), Anaktuvuk Pass.

Fishing Site	Resource	Total	Oct.	Nov	Dec.	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.
All Fishing Sites	All Resources	3,622	731	11	28	0	0	220	373	336	1,004	601	311	7
*	Burbot	12	4	7	0	0	0	0	0	1	0	0	0	0
	Dolly Varden	533	0	4	2	0	0	137	150	125	35	80	0	0
	Lake Trout	342	0	0	14	0	0	33	163	50	21	23	34	5
	Grayling	2,666	728	0	12	0	0	50	59	160	905	475	276	2
	Arctic Cisco	68	0	0	0	0	0	0	0	0	44	23	1	0
Upper John River	All Resources	358	0	0	0	0	0	0	35	0	95	118	110	0
	Dolly Varden	35	0	0	0	0	0	0	0	0	0	35	0	0
	Grayling	323	0	0	0	0	0	0	35	0	95	83	110	0
Annivik	All Resources	136	0	0	0	0	0	0	0	0	112	0	24	0
	Grayling	135	0	0	0	0	0	0	0	0	112	0	23	0
	Arctic Cisco	1	0	0	0	0	0	0	0	0	0	0	1	0
Tulugaq Lake	All Resources	198	0	7	0	0	0	0	0	0	129	40	21	0
	Burbot	7	0	7	0	0	0	0	0	0	0	0	0	0
	Dolly Varden	2	0	0	0	0	0	0	0	0	0	2	0	0
	Lake Trout	21	0	0	0	0	0	0	0	0	12	3	6	0
	Grayling	124	0	0	0	0	0	0	0	0	74	35	15	0
	Arctic Cisco	44	0	0	0	0	0	0	0	0	44	0	0	0
Contact Creek	All Resources	154	0	0	0	0	0	0	0	0	127	27	0	0
	Grayling	154	0	0	0	0	0	0	0	0	127	27	0	0
Glacier	All Resources	226	0	0	0	0	0	2	2	35	15	91	80	0
	Dolly Varden	6	0	0	0	0	0	0	0	0	0	6	0	0
	Grayling	221	0	0	0	0	0	2	2	35	15	86	80	0
Ikiakpuk	All Resources	869	728	0	0	0	0	72	1	5	8	43	13	0
	Burbot	1	0	0	0	0	0	0	0	1	0	0	0	0
	Dolly Varden	72	0	0	0	0	0	72	0	0	0	0	0	0
	Grayling	796	728	0	0	0	0	0	1	4	8	43	13	0

Table 5. cont. next page

Table 5. (cont.)

Fishing Site	Resource	Total	Oct.	Nov	Dec.	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.
Cache Lake	All Resources	229	0	0	0	0	0	47	0	2	52	97	24	6
	Lake Trout	32	0	0	0	0	0	0	0	0	0	10	17	5
	Grayling	173	0	0	0	0	0	47	0	2	52	64	7	1
	Arctic Cisco	23	0	0	0	0	0	0	0	0	0	23	0	0
Anaqtiqtuaq	All Resources	51	0	0	0	0	0	0	0	0	10	20	20	1
	Dolly Varden	6	0	0	0	0	0	0	0	0	5	1	0	0
	Lake Trout	20	0	0	0	0	0	0	0	0	0	9	10	0
	Grayling	25	0	0	0	0	0	0	0	0	6	9	9	1
Ekokpuk Creek	All Resources	36	0	0	0	0	0	0	0	0	0	36	0	0
	Dolly Varden	36	0	0	0	0	0	0	0	0	0	36	0	0
Inukpak	All Resources	373	0	0	0	0	0	0	0	118	228	20	7	0
	Grayling	373	0	0	0	0	0	0	0	118	228	20	7	0
Char Hole	All Resources	267	0	0	0	0	0	0	0	0	168	92	7	0
	Grayling	267	0	0	0	0	0	0	0	0	168	92	7	0
Qalutaq	All Resources	17	0	0	0	0	0	0	0	0	6	6	6	0
	Grayling	17	0	0	0	0	0	0	0	0	6	6	6	0
Chandler Lake *	All Resources	586	0	4	28	0	0	79	299	150	25	0	0	0
	Dolly Varden	351	0	4	2	0	0	60	148	124	13	0	0	0
	Lake Trout	203	0	0	14	0	0	19	135	26	9	0	0	0
	Grayling	32	0	0	12	0	0	0	17	0	3	0	0	0
Eleanor Lake	All Resources	15	4	0	0	0	0	0	0	0	0	12	0	0
	Burbot	4	4	0	0	0	0	0	0	0	0	0	0	0
	Grayling	12	0	0	0	0	0	0	0	0	0	12	0	0

Table 5. cont. next page

Table 5. (cont.)

Fishing Site	Resource	Total	Oct.	Nov	Dec.	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.
Weasel	All Resources	12	0	0	0	0	0	0	0	0	12	0	0	0
	Grayling	12	0	0	0	0	0	0	0	0	12	0	0	0
Itkillik Lake	All Resources	26	0	0	0	0	0	6	9	11	0	0	0	0
	Lake Trout	22	0	0	0	0	0	6	6	11	0	0	0	0
	Grayling	4	0	0	0	0	0	0	4	0	0	0	0	0
Shainin/Willow Lake *	All Resources	22	0	0	0	0	0	13	9	0	0	0	0	0
	Dolly Varden	5	0	0	0	0	0	5	0	0	0	0	0	0
	Lake Trout	18	0	0	0	0	0	8	9	0	0	0	0	0
Little Chandler Lake *	All Resources	27	0	0	0	0	0	0	15	12	0	0	0	0
	Dolly Varden	2	0	0	0	0	0	0	2	0	0	0	0	0
	Lake Trout	25	0	0	0	0	0	0	13	12	0	0	0	0
Clear Lake *	All Resources	17	0	0	0	0	0	0	0	0	17	0	0	0
	Dolly Varden	17	0	0	0	0	0	0	0	0	17	0	0	0
Missing	All Resources	2	0	0	0	0	0	0	0	2	0	0	0	0
	Dolly Varden	1	0	0	0	0	0	0	0	1	0	0	0	0
	Lake Trout	1	0	0	0	0	0	0	0	1	0	0	0	0

\*Reported lake catches of Dolly Varden are classified Arctic char in this report; see “Results” and “Discussion” sections.

Source: Pedersen and Hugo 2005

Table 6. Estimated Number of Fish Harvest by Location, Resource and Month of Fishing,  
Study Year 2 (October 2002-September 2003), Anaktuvuk Pass.

Fishing Site	Resource	Total	October	Nov.	Dec.	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.
All Fishing Sites	All Resources	2,324	175	0	0	0	35	102	659	221	358	438	310	26
	Burbot	5	0	0	0	0	0	0	0	2	0	3	0	0
	* Arctic Char	620	0	0	0	0	0	44	474	88	0	5	4	4
	* Dolly Varden	56	0	0	0	0	0	0	56	0	0	0	0	0
	Lake Trout	286	0	0	0	0	0	57	103	125	0	1	0	0
	Grayling	1,295	175	0	0	0	0	11	6	358	418	306	21	
	Arctic Cisco	11	0	0	0	0	0	0	0	0	0	11	0	0
Upper John River	Old Man	50	0	0	0	0	35	0	15	0	0	0	0	0
	All Resources	314	0	0	0	0	0	0	0	5	67	107	125	10
Tulugaq Lake	Grayling	314	0	0	0	0	0	0	0	5	67	107	125	10
	All Resources	31	0	0	0	0	0	0	0	0	0	31	0	0
	Burbot	3	0	0	0	0	0	0	0	0	0	3	0	0
	Lake Trout	1	0	0	0	0	0	0	0	0	0	1	0	0
	Grayling	15	0	0	0	0	0	0	0	0	0	15	0	0
Contact Creek	Arctic Cisco	11	0	0	0	0	0	0	0	0	0	11	0	0
	All Resources	72	0	0	0	0	0	0	0	0	0	18	43	11
Glacier	Grayling	72	0	0	0	0	0	0	0	0	0	18	43	11
	All Resources	135	0	0	0	0	0	0	0	0	36	84	15	0
Cache Lake	Grayling	135	0	0	0	0	0	0	0	0	36	84	15	0
	All Resources	101	0	0	0	0	0	0	0	1	61	29	10	0
Anaqtiqtuaq *	Grayling	101	0	0	0	0	0	0	0	1	61	29	10	0
	All Resources	83	0	0	0	0	0	0	0	0	69	5	4	4
	Arctic Char	7	0	0	0	0	0	0	0	0	0	0	3	4
Ekokpuk Creek	Grayling	76	0	0	0	0	0	0	0	0	69	5	1	0
	All Resources	233	175	0	0	0	35	0	22	0	0	0	0	0
	Dolly Varden	7	0	0	0	0	0	0	7	0	0	0	0	0
	Grayling	175	175	0	0	0	0	0	0	0	0	0	0	0
Inukpak	Old Man	50	0	0	0	0	35	0	15	0	0	0	0	0
	All Resources	117	0	0	0	0	0	0	0	0	41	16	60	0
	Grayling	117	0	0	0	0	0	0	0	0	41	16	60	0

Table 6. cont. next page

Table 6. (cont.)

Fishing Site	Resource	Total	Oct.	Nov.	Dec.	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.
Char Hole *	All Resources	11	0	0	0	0	0	0	0	6	0	5	0	0
	Arctic Char	6	0	0	0	0	0	0	0	6	0	0	0	0
	Grayling	5	0	0	0	0	0	0	0	0	0	5	0	0
Anaktuvuk River *	All Resources	14	0	0	0	0	0	0	0	0	7	5	2	0
	Arctic Char	1	0	0	0	0	0	0	0	0	0	0	1	0
	Grayling	13	0	0	0	0	0	0	0	0	7	5	1	0
Chandler Lake *	All Resources	766	0	0	0	0	0	65	580	116	0	5	0	0
	Arctic Char	535	0	0	0	0	0	30	436	63	0	5	0	0
	Dolly Varden	49	0	0	0	0	0	0	49	0	0	0	0	0
	Lake Trout	172	0	0	0	0	0	35	84	53	0	0	0	0
	Grayling	11	0	0	0	0	0	0	11	0	0	0	0	0
Weasel	All Resources	10	0	0	0	0	0	0	0	0	0	5	5	0
	Grayling	10	0	0	0	0	0	0	0	0	0	5	5	0
Itkillik Lake	All Resources	88	0	0	0	0	0	11	0	77	0	0	0	0
	Burbot	2	0	0	0	0	0	0	0	2	0	0	0	0
	Arctic Char	9	0	0	0	0	0	5	0	5	0	0	0	0
	Lake Trout	76	0	0	0	0	0	6	0	70	0	0	0	0
Shainin/Willow Lake	All Resources	14	0	0	0	0	0	7	7	0	0	0	0	0
	Lake Trout	14	0	0	0	0	0	7	7	0	0	0	0	0
Little Chandler Lake	All Resources	36	0	0	0	0	0	9	13	14	0	0	0	0
	Arctic Char	19	0	0	0	0	0	6	1	12	0	0	0	0
	Lake Trout	18	0	0	0	0	0	4	12	2	0	0	0	0
Amitchuaq Lake	All Resources	41	0	0	0	0	0	4	37	0	0	0	0	0
	Arctic Char	41	0	0	0	0	0	4	37	0	0	0	0	0
Loon Lake	All Resources	6	0	0	0	0	0	6	0	0	0	0	0	0
	Lake Trout	6	0	0	0	0	0	6	0	0	0	0	0	0
Napaatualuit Lake	All Resources	102	0	0	0	0	0	0	0	0	0	102	0	0
	Grayling	102	0	0	0	0	0	0	0	0	0	102	0	0
Naraksraurak Lake	All Resources	5	0	0	0	0	0	0	0	0	0	5	0	0
	Grayling	5	0	0	0	0	0	0	0	0	0	5	0	0
Missing	All Resources	145	0	0	0	0	0	0	0	2	77	20	46	0
	Arctic Char	2	0	0	0	0	0	0	0	2	0	0	0	0
	Grayling	143	0	0	0	0	0	0	0	0	77	20	46	0

\*Lake harvest of Dolly Varden is classified Arctic char and river harvest of Arctic char and “Old Man” Fish is classified Dolly Varden in this report; see “Results” and “Discussion” Sections.

Source: Pedersen and Hugo 2005.

Table 7. Estimated Harvest and Use of Fish, “Winter” 2001 (October 2001-May 2002), Anaktuvuk Pass.

Resource Name	Percentage of Households					Pounds Harvested			Amount Harvested		
	Use	Att	Harv	Recv	Give	Total	Mean HH	Per capita	Total	ea.	Mean HH
Fish	64.6	40.2	39.0	39.0	35.4	3,168	32.7	9.1	1,699	ea.	17.5
Burbot	0.0	0.0	3.7	0.0	0.0	47	0.5	0.1	12	ea.	0.1
Char	0.0	0.0	32.9	0.0	0.0	2,213	22.8	6.4	679	ea.	7.0
Arctic Char	0.0	0.0	28.0	0.0	0.0	1,173	12.1	3.4	419	ea.	4.3
Dolly Varden	0.0	0.0	0.0	0.0	0.0	0	0.0	0.0	0	ea.	0.0
Lake Trout	0.0	0.0	28.0	0.0	0.0	1,041	10.7	3.0	260	ea.	2.7
Grayling	0.0	0.0	17.1	0.0	0.0	907	9.4	2.6	1,008	ea.	10.4
Whitefish	0.0	0.0	0.0	0.0	0.0	0	0.0	0.0	0	ea.	0.0
Arctic Cisco	0.0	0.0	0.0	0.0	0.0	0	0.0	0.0	0	ea.	0.0

Source: Pedersen and Hugo 2005.

Table 8. Estimated Harvest and Use of Fish, “Summer” 2002 (June 2002-September 2002), Anaktuvuk Pass.

Resource Name	Percentage of Households					Pounds Harvested			Amount Harvested		
	Use	Att	Harv	Recv	Give	Total	Mean HH	Per capita	Total	ea.	Mean HH
All Fish	77.9	63.6	55.8	44.2	40.3	2,189	24.6	6.9	1,923	ea.	21.6
Burbot	0.0	0.0	0.0	0.0	0.0	0	0.0	0.0	0	ea.	0.0
Char	0.0	0.0	15.6	0.0	0.0	649	7.3	2.1	196	ea.	2.2
Arctic Char	0.0	0.0	10.4	0.0	0.0	320	3.6	1.0	114	ea.	1.3
Dolly Varden	0.0	0.0	0.0	0.0	0.0	0	0.0	0.0	0	ea.	0.0
Lake Trout	0.0	0.0	7.8	0.0	0.0	328	3.7	1.0	82	ea.	0.9
Grayling	0.0	0.0	49.4	0.0	0.0	1,493	16.8	4.7	1,659	ea.	18.6
Whitefish	0.0	0.0	3.9	0.0	0.0	48	0.5	0.2	68	ea.	0.8
Arctic Cisco	0.0	0.0	3.9	0.0	0.0	48	0.5	0.2	68	ea.	0.8

Source: Pedersen and Hugo 2005.

Table 9. Estimated Harvest and Use of Fish, Study Year 1 (October 2001-September 2002), Anaktuvuk Pass.

Resource Name	Percentage of Households					Pounds Harvested			Amount Harvested		
	Use	Att	Harv	Recv	Give	Total	Mean HH	Per capita	Total		Mean HH
All Fish	0.0	0.0	53.4	0.0	0.0	5,357	57.6	16.1	3,622	ea.	38.9
Burbot	0.0	0.0	3.8	0.0	0.0	47	0.5	0.1	12	ea.	0.1
Char	0.0	0.0	34.3	0.0	0.0	2,862	30.8	8.6	875	ea.	9.4
Arctic Char	0.0	0.0	29.3	0.0	0.0	1,493	16.1	4.5	533	ea.	5.7
Dolly Varden	0.0	0.0	0.0	0.0	0.0	0	0.0	0.0	0	ea.	0.0
Lake Trout	0.0	0.0	29.3	0.0	0.0	1,369	14.7	4.1	342	ea.	3.7
Grayling	0.0	0.0	47.2	0.0	0.0	2,400	25.8	7.2	2,666	ea.	28.7
Whitefish	0.0	0.0	3.7	0.0	0.0	48	0.5	0.1	68	ea.	0.7
Arctic Cisco	0.0	0.0	3.7	0.0	0.0	48	0.5	0.1	68	ea.	0.7

Source: Pedersen and Hugo 2005.

Table 10. Estimated Harvest and Use of Fish, “Winter” 2002 (October 2002-May 2003), Anaktuvuk Pass.

Resource Name	Percentage of Households					Pounds Harvested			Amount Harvested		
	Use	Att	Harv	Recv	Give	Total	Mean HH	Per capita	Total		Mean HH
All Fish	65.1	41.0	37.3	42.2	31.3	3,216	33.2	8.9	1,192	ea.	12.3
Burbot	0.0	0.0	1.2	0.0	0.0	9	0.1	0.0	2	ea.	0.0
Char	0.0	0.0	33.7	0.0	0.0	2,996	30.9	8.3	948	ea.	9.8
Arctic Char	0.0	0.0	30.1	0.0	0.0	1,829	18.9	5.1	653	ea.	6.7
Dolly Varden	0.0	0.0	2.4	0.0	0.0	26	0.3	0.1	9	ea.	0.1
Lake Trout	0.0	0.0	25.3	0.0	0.0	1,141	11.8	3.2	285	ea.	2.9
Grayling	0.0	0.0	6.0	0.0	0.0	172	1.8	0.5	192	ea.	2.0
Whitefish	0.0	0.0	0.0	0.0	0.0	0	0.0	0.0	0	ea.	0.0
Arctic Cisco	0.0	0.0	0.0	0.0	0.0	0	0.0	0.0	0	ea.	0.0
Unknown Fish	0.0	0.0	2.4	0.0	0.0	38	0.4	0.1	50	ea.	0.5

Source: Pedersen and Hugo 2005.



Table 11. Estimated Harvest and Use of Fish, “Summer” 2003 (June 2003-September 2003), Anaktuvuk Pass.

Resource Name	Percentage of Households					Pounds Harvested			Amount Harvested		
	Use	Att	Harv	Recv	Give	Total	Mean HH	Per capita	Total		Mean HH
All Fish	43.2	30.5	28.4	23.2	11.6	1,068	11.0	3.4	1,132	ea	11.7
Burbot	0.0	0.0	1.1	0.0	0.0	12	0.1	0.0	3	ea	0.0
Char	0.0	0.0	7.4	0.0	0.0	61	0.6	0.2	21	ea	0.2
Arctic Char	0.0	0.0	6.3	0.0	0.0	57	0.6	0.2	20	ea	0.2
Dolly Varden	0.0	0.0	0.0	0.0	0.0	0	0.0	0.0	0	ea	0.0
Lake Trout	0.0	0.0	1.1	0.0	0.0	4	0.0	0.0	1	ea	0.0
Grayling	0.0	0.0	24.2	0.0	0.0	987	10.2	3.1	1,097	ea	11.3
Whitefish	0.0	0.0	1.1	0.0	0.0	8	0.1	0.0	11	ea	0.1
Arctic Cisco	0.0	0.0	1.1	0.0	0.0	8	0.1	0.0	11	ea	0.1

Source: Pedersen and Hugo 2005.

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Table 12. Estimated Harvest and Use of Fish, Study Year 2 (October 2002-September 2003), Anaktuvuk Pass.

Resource Name	Percentage of Households					Pounds Harvested			Amount Harvested		
	Use	Att	Harv	Recv	Give	Total	Mean HH	Per capita	Total		Mean HH
All Fish	0.0	0.0	37.3	0.0	0.0	4,284	44.2	12.6	2,324	ea.	24.0
Burbot	0.0	0.0	1.2	0.0	0.0	22	0.2	0.1	5	ea.	0.1
Char	0.0	0.0	33.7	0.0	0.0	3,057	31.5	9.0	969	ea.	10.0
Arctic Char	0.0	0.0	30.1	0.0	0.0	1,886	19.4	5.6	674	ea.	6.9
Dolly Varden	0.0	0.0	2.4	0.0	0.0	26	0.3	0.1	9	ea.	0.1
Lake Trout	0.0	0.0	25.3	0.0	0.0	1,145	11.8	3.4	286	ea.	3.0
Grayling	0.0	0.0	24.2	0.0	0.0	1,159	12.0	3.4	1,288	ea.	13.3
Whitefish	0.0	0.0	1.1	0.0	0.0	8	0.1	0.0	11	ea.	0.1
Arctic Cisco	0.0	0.0	1.1	0.0	0.0	8	0.1	0.0	11	ea.	0.1
Unknown Fish	0.0	0.0	2.4	0.0	0.0	38	0.4	0.1	50	ea.	0.5

Source: Pedersen and Hugo 2005.

Table 13. Estimated Number of Households Harvesting Fish by Fishing Site, Resource and Month of Fishing, Study Year 1 (October 2001-September 2002), Anaktuvuk Pass.

Fishing Site	Resource	Oct.	Nov.	Dec.	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Unkn. Month
All Fishing Sites	All Resources	4.7	1.2	1.2	0.0	0.0	16.6	26.0	16.6	27.7	28.9	19.6	3.5	0.0
	Burbot	1.2	1.2	0.0	0.0	0.0	0.0	0.0	1.2	0.0	0.0	0.0	0.0	0.0
	* Dolly Varden	0.0	1.2	1.2	0.0	0.0	11.8	16.6	9.5	4.6	5.8	0.0	0.0	0.0
	Lake Trout	0.0	0.0	1.2	0.0	0.0	8.3	17.7	8.3	2.3	3.5	3.5	1.2	0.0
	Grayling	3.5	0.0	1.2	0.0	0.0	2.4	8.3	5.9	25.4	25.4	17.3	2.3	0.0
	Arctic Cisco	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.2	1.2	1.2	0.0	0.0
Upper John River	All Resources	0.0	0.0	0.0	0.0	0.0	0.0	1.2	0.0	2.3	4.6	4.6	0.0	0.0
	Dolly Varden	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.2	0.0	0.0	0.0
	Grayling	0.0	0.0	0.0	0.0	0.0	0.0	1.2	0.0	2.3	4.6	4.6	0.0	0.0
Annivik	All Resources	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.3	0.0	1.2	0.0	0.0
	Grayling	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.3	0.0	1.2	0.0	0.0
	Arctic Cisco	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.2	0.0	0.0
Tulugaq Lake	All Resources	0.0	1.2	0.0	0.0	0.0	0.0	0.0	0.0	4.6	2.3	1.2	0.0	0.0
	Burbot	0.0	1.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	* Dolly Varden	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.2	0.0	0.0	0.0
	Lake Trout	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.2	2.3	1.2	0.0	0.0
	Grayling	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.3	1.2	1.2	0.0	0.0
	Arctic Cisco	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.2	0.0	0.0	0.0	0.0
Contact Creek	All Resources	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.3	2.3	0.0	0.0	0.0
	Grayling	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.3	2.3	0.0	0.0	0.0
Glacier	All Resources	0.0	0.0	0.0	0.0	0.0	1.2	1.2	2.4	3.5	6.9	8.1	0.0	0.0
	Dolly Varden	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.2	0.0	0.0	0.0
	Grayling	0.0	0.0	0.0	0.0	0.0	1.2	1.2	2.4	3.5	6.9	8.1	0.0	0.0
Ikiakupuk	All Resources	3.5	0.0	0.0	0.0	0.0	1.2	1.2	2.4	1.2	2.3	2.3	0.0	0.0
	Burbot	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.2	0.0	0.0	0.0	0.0	0.0
	Dolly Varden	0.0	0.0	0.0	0.0	0.0	1.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Grayling	3.5	0.0	0.0	0.0	0.0	0.0	1.2	1.2	1.2	2.3	2.3	0.0	0.0
Cache Lake	All Resources	0.0	0.0	0.0	0.0	0.0	1.2	0.0	1.2	6.9	9.2	3.5	2.3	0.0
	Lake Trout	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.2	2.3	1.2	0.0
	Grayling	0.0	0.0	0.0	0.0	0.0	1.2	0.0	1.2	6.9	8.1	1.2	1.2	0.0
	Arctic Cisco	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.2	0.0	0.0	0.0

Table 13. cont. next page

Table 13. (cont.)

Fishing Site	Resource	Oct.	Nov.	Dec.	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Unkn. Month
Ekokpuk Creek *	All Resources	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.2	0.0	0.0	0.0
	Dolly Varden	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.2	0.0	0.0	0.0
Inukpak	All Resources	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.2	3.5	2.3	1.2	0.0	0.0
	Grayling	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.2	3.5	2.3	1.2	0.0	0.0
Char Hole	All Resources	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.5	3.5	1.2	0.0	0.0
	Grayling	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.5	3.5	1.2	0.0	0.0
Qalutaq	All Resources	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.2	1.2	1.2	0.0	0.0
	Grayling	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.2	1.2	1.2	0.0	0.0
Chandler Lake *	All Resources	0.0	1.2	1.2	0.0	0.0	10.6	18.9	9.5	1.2	0.0	0.0	0.0	0.0
	Dolly Varden	0.0	1.2	1.2	0.0	0.0	8.3	15.4	8.3	1.2	0.0	0.0	0.0	0.0
	Lake Trout	0.0	0.0	1.2	0.0	0.0	4.7	13.0	3.5	1.2	0.0	0.0	0.0	0.0
	Grayling	0.0	0.0	1.2	0.0	0.0	0.0	3.5	0.0	1.2	0.0	0.0	0.0	0.0
Eleanor Lake	All Resources	1.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.2	0.0	0.0	0.0
	Burbot	1.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Grayling	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.2	0.0	0.0	0.0
Weasel	All Resources	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.2	0.0	0.0	0.0	0.0
	Grayling	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.2	0.0	0.0	0.0	0.0
Itkillik Lake	All Resources	0.0	0.0	0.0	0.0	0.0	1.2	2.4	2.4	0.0	0.0	0.0	0.0	0.0
	Lake Trout	0.0	0.0	0.0	0.0	0.0	1.2	1.2	2.4	0.0	0.0	0.0	0.0	0.0
	Grayling	0.0	0.0	0.0	0.0	0.0	0.0	1.2	0.0	0.0	0.0	0.0	0.0	0.0
Shainin/Willow Lake *	All Resources	0.0	0.0	0.0	0.0	0.0	4.7	1.2	0.0	0.0	0.0	0.0	0.0	0.0
	Dolly Varden	0.0	0.0	0.0	0.0	0.0	2.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Lake Trout	0.0	0.0	0.0	0.0	0.0	2.4	1.2	0.0	0.0	0.0	0.0	0.0	0.0
Little Chandler Lake *	All Resources	0.0	0.0	0.0	0.0	0.0	0.0	2.4	1.2	0.0	0.0	0.0	0.0	0.0
	Dolly Varden	0.0	0.0	0.0	0.0	0.0	0.0	1.2	0.0	0.0	0.0	0.0	0.0	0.0
	Lake Trout	0.0	0.0	0.0	0.0	0.0	0.0	2.4	1.2	0.0	0.0	0.0	0.0	0.0
Clear Lake *	All Resources	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.2	0.0	0.0	0.0	0.0
	Dolly Varden	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.2	0.0	0.0	0.0	0.0
Missing	All Resources	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.2	0.0	0.0	0.0	0.0	0.0
	Dolly Varden	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.2	0.0	0.0	0.0	0.0	0.0
	Lake Trout	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.2	0.0	0.0	0.0	0.0	0.0

\*Lake harvest of Dolly Varden is classified Arctic char and river harvest of Arctic char is classified Dolly Varden in this report; see “Results” and “Discussion” sections. Source: Pedersen and Hugo 2005.

Table 14. Estimated Number of Households Harvesting Fish by Fishing Site, Resource and Month of Fishing, Study Year 2 (October 2002-September 2003), Anaktuvuk Pass.

Fishing Site	Resource	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	April	May	June	July	Aug.	Sept.	Unkn. month
All Sites	All Resources	1.2	0.0	0.0	0.0	1.2	12.9	25.7	14.0	13.3	19.4	11.2	4.1	0.0
	Burbot	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.2	0.0	1.0	0.0	0.0	0.0
	Arctic Char	0.0	0.0	0.0	0.0	0.0	9.3	22.2	9.3	0.0	1.0	2.0	2.0	0.0
	Dolly Varden	0.0	0.0	0.0	0.0	0.0	0.0	3.5	0.0	0.0	0.0	0.0	0.0	0.0
	Lake Trout	0.0	0.0	0.0	0.0	0.0	10.5	14.0	8.2	0.0	1.0	0.0	0.0	0.0
	Grayling	1.2	0.0	0.0	0.0	0.0	0.0	2.3	2.3	13.3	17.4	10.2	2.0	0.0
	Arctic Cisco	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.0	0.0	0.0	0.0
	Unknown Non-Salmon Fish	0.0	0.0	0.0	0.0	1.2	0.0	1.2	0.0	0.0	0.0	0.0	0.0	0.0
Upper John River	All Resources	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.2	5.1	5.1	3.1	1.0	0.0
	Grayling	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.2	5.1	5.1	3.1	1.0	0.0
Tulugaq Lake	All Resources	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.1	0.0	0.0	0.0
	Burbot	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.0	0.0	0.0	0.0
	Lake Trout	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.0	0.0	0.0	0.0
	Grayling	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.0	0.0	0.0	0.0
	Arctic Cisco	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.0	0.0	0.0	0.0
Contact Creek	All Resources	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.0	1.0	1.0	0.0
	Grayling	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.0	1.0	1.0	0.0
Glacier	All Resources	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	4.1	7.1	3.1	0.0	0.0
	Grayling	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	4.1	7.1	3.1	0.0	0.0
Cache Lake	All Resources	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.2	2.0	4.1	1.0	0.0	0.0
	Grayling	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.2	2.0	4.1	1.0	0.0	0.0
Anaqtiqtuq *	All Resources	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.0	1.0	2.0	2.0	0.0
	Arctic Char	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.0	2.0	0.0
	Grayling	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.0	1.0	1.0	0.0	0.0
Ekokpuk Creek	All Resources	1.2	0.0	0.0	0.0	1.2	0.0	2.3	0.0	0.0	0.0	0.0	0.0	0.0
	Dolly Varden	0.0	0.0	0.0	0.0	0.0	0.0	1.2	0.0	0.0	0.0	0.0	0.0	0.0
	Grayling	1.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Unknown Non-Salmon Fish	0.0	0.0	0.0	0.0	1.2	0.0	1.2	0.0	0.0	0.0	0.0	0.0	0.0

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Table 14. (cont.)

Fishing Site	Resource	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	April	May	June	July	Aug.	Sept.	Unkn. month
Inukpak	All Resources	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.0	1.0	1.0	0.0	0.0
	Grayling	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.0	1.0	1.0	0.0	0.0
Char Hole *	All Resources	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.2	0.0	1.0	0.0	0.0	0.0
	Arctic Char	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.2	0.0	0.0	0.0	0.0	0.0
	Grayling	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.0	0.0	0.0	0.0
Anaktuvuk River *	All Resources	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.0	1.0	2.0	0.0	0.0
	Arctic Char	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.0	0.0	0.0
	Grayling	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.0	1.0	1.0	0.0	0.0
Chandler Lake *	All Resources	0.0	0.0	0.0	0.0	0.0	5.8	21.0	7.0	0.0	1.0	0.0	0.0	0.0
	Arctic Char	0.0	0.0	0.0	0.0	0.0	4.7	19.9	5.8	0.0	1.0	0.0	0.0	0.0
	Dolly Varden	0.0	0.0	0.0	0.0	0.0	0.0	2.3	0.0	0.0	0.0	0.0	0.0	0.0
	Lake Trout	0.0	0.0	0.0	0.0	0.0	4.7	10.5	5.8	0.0	0.0	0.0	0.0	0.0
	Grayling	0.0	0.0	0.0	0.0	0.0	0.0	2.3	0.0	0.0	0.0	0.0	0.0	0.0
Weasel	All Resources	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.0	1.0	0.0	0.0
	Grayling	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.0	1.0	0.0	0.0
Itkillik Lake	All Resources	0.0	0.0	0.0	0.0	0.0	1.2	0.0	3.5	0.0	0.0	0.0	0.0	0.0
	Burbot	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.2	0.0	0.0	0.0	0.0	0.0
	Arctic Char	0.0	0.0	0.0	0.0	0.0	1.2	0.0	1.2	0.0	0.0	0.0	0.0	0.0
	Lake Trout	0.0	0.0	0.0	0.0	0.0	1.2	0.0	1.2	0.0	0.0	0.0	0.0	0.0
Shainin/Willow Lake	All Resources	0.0	0.0	0.0	0.0	0.0	2.3	2.3	0.0	0.0	0.0	0.0	0.0	0.0
	Lake Trout	0.0	0.0	0.0	0.0	0.0	2.3	2.3	0.0	0.0	0.0	0.0	0.0	0.0
Little Chandler Lake	All Resources	0.0	0.0	0.0	0.0	0.0	2.3	2.3	2.3	0.0	0.0	0.0	0.0	0.0
	Arctic Char	0.0	0.0	0.0	0.0	0.0	2.3	1.2	1.2	0.0	0.0	0.0	0.0	0.0
	Lake Trout	0.0	0.0	0.0	0.0	0.0	1.2	1.2	1.2	0.0	0.0	0.0	0.0	0.0
Amitchuaq Lake	All Resources	0.0	0.0	0.0	0.0	0.0	1.2	2.3	0.0	0.0	0.0	0.0	0.0	0.0
	Arctic Char	0.0	0.0	0.0	0.0	0.0	1.2	2.3	0.0	0.0	0.0	0.0	0.0	0.0
Loon Lake	All Resources	0.0	0.0	0.0	0.0	0.0	1.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Lake Trout	0.0	0.0	0.0	0.0	0.0	1.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0

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Table 14. (cont.)

Fishing Site	Resource	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	April	May	June	July	Aug.	Sept.	Unkn. month
Napaatualuit Lake	All Resources	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.0	0.0	0.0	0.0
	Grayling	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.0	0.0	0.0	0.0
Naraksraurak Lake	All Resources	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.0	0.0	0.0	0.0
	Grayling	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.0	0.0	0.0	0.0
Missing	All Resources	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.2	1.0	1.0	1.0	0.0	0.0
	Arctic Char	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.2	0.0	0.0	0.0	0.0	0.0
	Grayling	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.0	1.0	1.0	0.0	0.0

\*Lake harvest of Dolly Varden is classified Arctic char and river harvest of Arctic char is classified Dolly Varden in this report; see “Results” and “Discussion” sections. Source: Pedersen and Hugo 2005.

Table 15. Estimated Number of Dolly Varden\* Harvested by Fishing Site and Month of Fishing, Study Year 1 (October 2001-September 2002), Anaktuvuk Pass.

Fishing Site	Total		November		December		March		April		May		June		July	
	Est. Harv.	% of est. total harvest in month	Est. Harv.	% of est. total harvest in month	Est. Harv.	% of est. total harvest in month	Est. Harv.	% of est. total harvest in month	Est. Harv.	% of est. total harvest in month	Est. Harv.	% of est. total harvest in month	Est. Harv.	% of est. total harvest in month	Est. Harv.	% of est. total harvest in month
Upper John River	35	6.5%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	35	43.5%
Tulugaq Lake	2	0.4%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	2	2.9%
Glacier	6	1.1%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	6	7.2%
Ikiakpuk	72	13.5%	0	0.0%	0	0.0%	72	52.6%	0	0.0%	0	0.0%	0	0.0%	0	0.0%
Anaqtigtuaq	6	1.1%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	5	13.3%	1	1.4%
Ekokpuk Creek	36	6.7%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	36	44.9%
Chandler Lake	351	65.8%	4	100.0%	2	100.0%	60	44.0%	148	98.4%	124	99.1%	13	36.7%	0	0.0%
Shainin/Willow Lake	5	0.9%	0	0.0%	0	0.0%	5	3.4%	0	0.0%	0	0.0%	0	0.0%	0	0.0%
Little Chandler Lake	2	0.4%	0	0.0%	0	0.0%	0	0.0%	2	1.6%	0	0.0%	0	0.0%	0	0.0%
Clear Lake	17	3.3%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	17	50.0%	0	0.0%
Missing	1	0.2%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	1	0.9%	0	0.0%	0	0.0%
All Sites	533	100.0%	4	100.0%	2	100.0%	137	100.0%	150	100.0%	125	100.0%	35	100.0%	80	100.0%

\*Lake harvest of Dolly Varden is classified Arctic char and river harvest of Arctic char is classified Dolly Varden in this report; see “Results” and “Discussion” sections.

Source: Pedersen and Hugo 2005.

Table 16. Estimated Number of Dolly Varden\* Harvested by Fishing Site and Month of Fishing, Study Year 2 (October 2002-September 2003), Anaktuvuk Pass.

	Total		April	
Fishing Site	Est. Harvest	% of est. total harvest in month	Est. Harvest	% of est. total harvest in month
Ekokpuk Creek	7	12.5%	7	12.5%
Chandler Lake	49	87.5%	49	87.5%
Missing	0	0.0%	0	0.0%
All Sites	56	100.0%	56	100.0%

\*Lake harvest of Dolly Varden is classified Arctic char and river harvest of Arctic char is classified Dolly Varden in this report; see “Results” and “Discussion” sections.

Source: Pedersen and Hugo 2005.



Table 17. Estimated Number of Arctic char\* Harvested by Fishing Site and Month of Fishing, Study Year 2 (October 2002-September 2003), Anaktuvuk Pass.

Fishing Site	Total		March		April		May		July		August		September	
	Est. Harv.	% of est. total harvest in month	Est. Harv.	% of est. total harvest in month	Est. Harv.	% of est. total harvest in month	Est. Harv.	% of est. total harvest in month	Est. Harv.	% of est. total harvest in month	Est. Harv.	% of est. total harvest in month	Est. Harv.	% of est. total harvest in month
Anaqtuqtaq	7	1.2%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	3	75.0%	4	100.0%
Char Hole	6	0.9%	0	0.0%	0	0.0%	6	6.7%	0	0.0%	0	0.0%	0	0.0%
Anaktuvuk R.	1	0.2%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	1	25.0%	0	0.0%
Chandler Lake	535	86.2%	30	68.4%	436	91.9%	63	72.0%	5	100.0%	0	0.0%	0	0.0%
Itkillik Lake	9	1.5%	5	10.5%	0	0.0%	5	5.3%	0	0.0%	0	0.0%	0	0.0%
Little Chandler Lake	19	3.0%	6	13.2%	1	0.2%	12	13.3%	0	0.0%	0	0.0%	0	0.0%
Amitchuaq Lake	41	6.6%	4	7.9%	37	7.9%	0	0.0%	0	0.0%	0	0.0%	0	0.0%
Missing	2	0.4%	0	0.0%	0	0.0%	2	2.7%	0	0.0%	0	0.0%	0	0.0%
All Sites	620	100.0%	44	100.0%	474	100.0%	88	100.0%	5	100.0%	4	100.0%	4	100.0%

\*Lake harvest of Dolly Varden is classified Arctic char and river harvest of Arctic char is classified Dolly Varden in this report; see “Results” and “Discussion” sections.

Source: Pedersen and Hugo 2005.

Table 18. Estimated Number of “Old Man” Fish\* Harvested by Fishing Site and Month of Fishing, Study Year 2 (October 2002-September 2003), Anaktuvuk Pass.

Fishing Site	Total		February		March		April	
	Est. Harvest	% of est. total harvest in month	Est. Harvest	% of est. total harvest in month	Est. Harvest	% of est. total harvest in month	Est. Harvest	% of est. total harvest in month
Ekokpuk Creek	50	100.0%	35	100.0%	0	0.0%	15	100.0%
Missing	0	0.0%	0	0.0%	0	0.0%	0	0.0%
All Sites	50	100.0%	35	100.0%	0	0.0%	15	100.0%

\*Lake harvest of Dolly Varden is classified Arctic char, river harvest of Arctic char is classified Dolly Varden and “Old Man” fish is classified as Dolly Varden in this report; see “Results” and “Discussion” sections.

Source: Pedersen and Hugo 2005.

Table 19. Households Use of Harvesting Dolly Varden\* Fishing Sites by Month, Study Year 1 (October 2001-September 2002), Anaktuvuk Pass.

	November		December		March		April		May		June		July	
Fishing Site	Est. numb er of fishin g hh's	% of hh's fishing in month	Est. numbe r of fishing hh's	% of hh's fishing in month	Est. numbe r of fishing hh's	% of hh's fishing in month	Est. numbe r of fishing hh's	% of hh's fishing in month	Est. numbe r of fishing hh's	% of hh's fishing in month	Est. numbe r of fishing hh's	% of hh's fishing in month	Est. numbe r of fishing hh's	% of hh's fishing in month
Upper John River	0.0	0.0%	0.0	0.0%	0.0	0.0%	0.0	0.0%	0.0	0.0%	0.0	0.0%	1.2	20.0%
Tulugaq Lake*	0.0	0.0%	0.0	0.0%	0.0	0.0%	0.0	0.0%	0.0	0.0%	0.0	0.0%	1.2	20.0%
Glacier	0.0	0.0%	0.0	0.0%	0.0	0.0%	0.0	0.0%	0.0	0.0%	0.0	0.0%	1.2	20.0%
Ikiakpuk	0.0	0.0%	0.0	0.0%	1.2	10.0%	0.0	0.0%	0.0	0.0%	0.0	0.0%	0.0	0.0%
Anaqtigtuaq	0.0	0.0%	0.0	0.0%	0.0	0.0%	0.0	0.0%	0.0	0.0%	2.3	50.0%	1.2	20.0%
Ekokpuk Creek	0.0	0.0%	0.0	0.0%	0.0	0.0%	0.0	0.0%	0.0	0.0%	0.0	0.0%	1.2	20.0%
		100.0		100.0										
Chandler Lake*	1.2	%	1.2	%	8.3	70.0%	15.4	92.9%	8.3	87.5%	1.2	25.0%	0.0	0.0%
Shainin/Willow Lake	0.0	0.0%	0.0	0.0%	2.4	20.0%	0.0	0.0%	0.0	0.0%	0.0	0.0%	0.0	0.0%
Little Chandler Lake*	0.0	0.0%	0.0	0.0%	0.0	0.0%	1.2	7.1%	0.0	0.0%	0.0	0.0%	0.0	0.0%
Clear Lake*	0.0	0.0%	0.0	0.0%	0.0	0.0%	0.0	0.0%	0.0	0.0%	1.2	25.0%	0.0	0.0%
Missing	0.0	0.0%	0.0	0.0%	0.0	0.0%	0.0	0.0%	1.2	12.5%	0.0	0.0%	0.0	0.0%
		100.0		100.0		100.0		100.0		100.0		100.0		
All Sites	1.2	%	1.2	%	11.8	%	16.6	%	9.5	%	4.6	%	5.8	100.0%

\*Lake harvest of Dolly Varden is classified Arctic char in this report; see “Results” and “Discussion” sections.

Source: Pedersen and Hugo 2005.

Table 20. Household Use of Dolly Varden\* by Fishing Sites by Month,  
Study Year 2 (October 2002 to September 2003),  
Anaktuvuk Pass.

Fishing Site	All Fishing Sites		April	
	Est. number of fishing hh's	% of hh's fishing in month	Est. number of fishing hh's	% of hh's fishing in month
Ekokpuk Creek	1.2	33.3%	1.2	33.3%
Chandler Lake*	2.3	66.7%	2.3	66.7%
Missing	0.0	0.0%	0.0	0.0%
All Sites	3.5	100.0%	3.5	100.0%

\*Lake harvest of Dolly Varden is classified as Arctic char  
in this report; see “Results” and “Discussion” sections.

Source: Pedersen and Hugo 2005

Table 21. Household Use of Arctic char\* by Fishing Sites by Month of Fishing, Study Year 2 (October 2002-September 2003), Anaktuvuk Pass.

Fishing Sites	March		April		May		July		August		September	
	Est. number of fishing hh's	% of hh's fishing in month	Est. number of fishing hh's	% of hh's fishing in month	Est. number of fishing hh's	% of hh's fishing in month	Est. number of fishing hh's	% of hh's fishing in month	Est. number of fishing hh's	% of hh's fishing in month	Est. number of fishing hh's	% of hh's fishing in month
Anaqtigtuaq*	0.0	0.0%	0.0	0.0%	0.0	0.0%	0.0	0.0%	1.0	50.0%	2.0	100.0%
Char Hole*	0.0	0.0%	0.0	0.0%	1.2	12.5%	0.0	0.0%	0.0	0.0%	0.0	0.0%
Anaktuvuk R.*	0.0	0.0%	0.0	0.0%	0.0	0.0%	0.0	0.0%	1.0	50.0%	0.0	0.0%
Chandler Lake	4.7	50.0%	19.9	89.5%	5.8	62.5%	1.0	100.0%	0.0	0.0%	0.0	0.0%
Itkillik Lake	1.2	12.5%	0.0	0.0%	1.2	12.5%	0.0	0.0%	0.0	0.0%	0.0	0.0%
Little Chandler Lake	2.3	25.0%	1.2	5.3%	1.2	12.5%	0.0	0.0%	0.0	0.0%	0.0	0.0%
Amitchuaq Lake	1.2	12.5%	2.3	10.5%	0.0	0.0%	0.0	0.0%	0.0	0.0%	0.0	0.0%
Missing	0.0	0.0%	0.0	0.0%	1.2	12.5%	0.0	0.0%	0.0	0.0%	0.0	0.0%
All Sites	9.3	100.0%	22.2	100.0%	9.3	100.0%	1.0	100.0%	2.0	100.0%	2.0	100.0%

\*River harvest of Arctic char is classified Dolly Varden in this report; see “Results” and “Discussion” sections.

Source: Pedersen and Hugo 2005.

Table 22. Household Use of “Old Man\*” Fishing Sites by Month,  
Study Year 2 (October 2002-September 2003),  
Anaktuvuk Pass.

Fishing Site	February		April	
	Est. number of fishing hh's	% of hh's fishing in month	Est. number of fishing hh's	% of hh's fishing in month
Ekokpuk Creek*	1.2	100.0%	1.2	100.0%
Missing	0.0	0.0%	0.0	0.0%
All locations	1.2	100.0%	1.2	100.0%

\*“Old Man” fish harvest is classified as Dolly Varden in this report; see “Results” and “Discussion” sections.

Source: Pedersen and Hugo 2005.

Table 23. Revised Estimate\* of Number and Pounds of Dolly Varden Harvested by Fishing Site, Study Year and Season, Anaktuvuk Pass.

Fishing Site**		Study Year 1**		Study Year 2**		Dolly Varden Harvest Estimate*	
No.	Name	"Winter"	"Summer"	"Winter"	"Summer"	Number	Pounds
1	John River	0	35	0	0	35	98
5	Glacier	0	6	0	0	6	17
6	Ikiakpuk	72	0	0	0	72	202
8	Anaqtiqtuaq	0	6	0	7	13	36
9	Ekopuk Creek	0	36	7(+50***)	0	43(+50***)	160
11	Char Hole	0	0	6	0	6	17
13	Anaktuvuk River	0	0	0	1	1	3
Total		72	83	13(+50***)	8		

\* Revision based on Dolly Varden and Arctic char distribution information presented in the "Results" and "Discussion" sections of this report.

\*\* Reported Dolly Varden, Arctic char and "Old Man" Fish Harvest from River/Creek Sites only (Tables 5 and 6).

\*\*\* "Old Man" Fish (est. weight = 0.8 lbs ea.; Dolly Varden est. weight = 2.8 lbs ea.; Scott et al. 1992).

Source: Pedersen and Hugo 2005.

# **APPENDICES** **Appendix 1: Household Survey Instrument**

HH ID \_\_\_\_\_-02W      DATE \_\_\_\_\_      INTERVIEWER \_\_\_\_\_      COMMUNITY 12

## ANAKTUVUK SUBSISTENCE FISH HARVEST SURVEY

A cooperative effort of the City of Anaktuvuk Pass and ADF&G, Division of Subsistence

1. How many people lived in the household this past year? \_\_\_\_\_ INUPIAT HH? YES NO
2. Since freeze-up last fall (October 2001) through break-up this May/June (2002), did you or anyone in your household:

GO FISHING? YES NO      HOW MANY IN HH FISHED? \_\_\_\_\_      Catch Fish? YES NO

RECEIVE FISH FROM ANOTHER HOUSEHOLD? YES NO

GIVE FISH TO ANOTHER HOUSEHOLD? YES NO

If NO to Go Fishing? ask Receive and Give questions then skip to Question 6

If NO to Catch Fish? ask Receive and Give questions then skip to Question 5.

- 3a. How many iqualukpik (char), sulukpaugaq (grayling), iqaluaqpak (lake trout), tittaliq (burbot) and other fish did all the people fishing in your household catch during winter (by month)?

Fish Type	2001			2002						Unknown	Overall
	Oct.	Nov.	Dec.	Jan	Feb.	March	April	May	June		Total
Iqualukpik											
Sulukpaugaq											
Iqaluaqpak											
Tittaliq											
Other Fish											

Please tell us where your household caught the fish reported in 3(a); turn the page to list by month, where, fish type, fishing method and how you got to the fishing area.

4. During the winter did you or anyone in your household catch any fish that were not used because they did not look healthy? YES \* NO

\*If YES, what was wrong with them?

Symptom	What kind of fish, how many, which month(s) and where?	Symptom	What kind of fish, how many, which month(s) and where?
1.		3.	
2.		4.	

Were these fish counted (reported) in question 3(a)?

YES

NO

5. If your HH did not catch any fish this winter - What was the reason that your household was unsuccessful?

6. Do you have any comments or concerns about fishing in the Anaktuvuk area?

Quyanaq!



**APPENDIX 1** (continued)

**3b. FISH HARVEST LOCATION INFORMATION – WINTER 2001/2002**

WHERE DID YOUR HOUSEHOLD CATCH FISH IN THE MONTHS REPORTED IN QUESTION 3a.

			KIND, NUMBER, AND FISHING METHOD			HOW DID YOU GET TO THE FISHING AREA?		
MONTH	WHERE (PLACE NAME)	Loc. Code	FISH KIND	NUMBER CAUGHT	FISHING METHOD	SNOWMACHINE? Y/N	ATV? Y/N	OTHER? DESCRIBE

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